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NETWORK WORLD

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

USA unplugged: Airwaves open up for wireless

BY ELLEN MESSMER

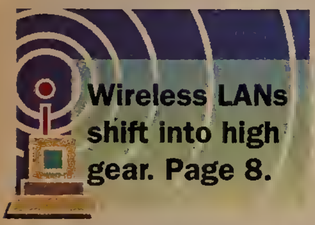
Washington, D.C.

In a decision that opens the road to a new era in wireless networking, the Federal Communications Commission last week set aside a chunk of the airwaves for new personal communications services (PCS).

The agency allocated 3 MHz of unoccupied spectrum in the 900-MHz band for narrowband PCS, including new messaging and advanced paging services, and indicated it may eventually license as many as 11 companies to offer PCSs on a nationwide basis.

The FCC put one company on the fast track to offering nationwide ser-

See **FCC**, *page 68*


Wireless LANs shift into high gear. Page 8.

ETHERNETS

Chipcom, Artel add switch options

BY SKIP MACASKILL

As work continues on a suite of new technologies designed to ease the bandwidth crunch on today's networks, the well-established Ethernet switching option continues to make strides.

Chipcom Corp. this week will introduce its first Ethernet switching product, and early market entrant Artel Communications Corp. is enhancing its Ethernet switch with Fiber Distributed Data Interface support and other new functions.

Chipcom's ONline Ethernet Interconnect Module fits into its ONline System Concentrator intelligent hub and handles three internetworking functions: Ethernet switching, bridging and routing. Jointly developed with Retix, the module is based on Intel Corp.'s i960 Reduced Instruction Set Computing microprocessor and can be configured as a packet engine for Ethernet switching, a bridge, a bridge/router or any combination of the three.

The module, which connects to all three of the hub's Ethernet backplane segments, has five ports: three 10Base-T RJ-45 connections and two attachment

See **Chipcom, Artel**, *page 70*

NEWSPAPER

100

NetWare gets mail, mgmt. make-over

Sun, IBM and HP platforms get control over NetWare LANs.

BY MICHAEL COONEY
AND CARYN GILLOOLY

Mountain View, Calif.

While a string of management platform vendors stand poised to announce applications for managing Novell, Inc. NetWare LANs, SunConnect was first out of the gate last week in a joint announcement with Novell.

SunConnect will deliver by early next year software that gives SunNet Manager support for NetWare, the companies said, while sources indicate that IBM, Hewlett-Packard Co. and others are at work on similar applications.

"[Novell's] talking to all the vendors of major management platforms to make sure they can manage NetWare," said a source familiar with Novell's plans. "Hewlett-Packard is talking to Novell about OpenView, IBM is talking to Novell about NetView/6000, and even the legacy systems vendors like LEGENT [Corp.] are talking to Novell."

Sources expect HP's announcement to come next, with IBM not far behind. Officials at Big Blue confirmed that the company is working on a NetWare management application for NetView/6000, but HP would neither confirm nor deny the reports regarding OpenView.

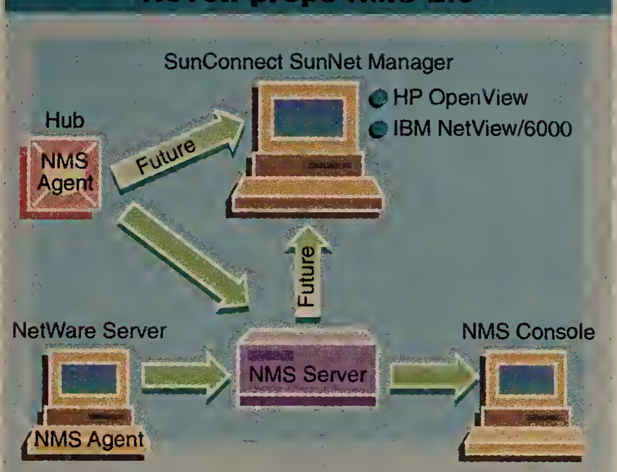
All of the products will take advantage of an enhanced version of the NetWare Management System (NMS) outfitted with features that analysts said should help repair the product's tarnished image.

Novell has already released into beta test NMS 2.0, which the company plans to deliver this fall.

The new version will offer enhanced Simple

See NMS, *page 70*

Novell preps NMS 2.0



Novell, Inc.'s NetWare Management System Version 2.0 will have 3 components – NMS Agent, NMS Server and NMS Console – that can operate in a pure NetWare environment or work with third-party management systems.

GRAPHIC BY SUSAN J. CHAMPENY

'Personal' version of NetWare Global MHS mail in the works.

BY CARYN GILLOOLY

San Jose, Calif.

Novell, Inc. this fall is expected to introduce a "personalized" version of its NetWare Global MHS product designed for laptop and other remote users.

The product, to be called NetWare Remote MHS, will be a scaled-down version of NetWare Global MHS, replacing the company's current Personal MHS product, sources said.

Like Personal MHS, the new software will be for individual machines — most likely laptops — that dial into corporate networks. It will let users retrieve messages as if they were locally connected. But it will be much simpler than Personal MHS. The existing product lets the remote user dial into the network, but the machine dialing in must be set up as a remote host — essentially, a one-user local-area network.

"This is an important release because the old product required so much overhead" in terms of both memory

See **NetWare mgmt.**, *page70*

Portable, yes, but not yours to keep

BY ANITA TAFF

Washington, D.C.

Even though 800-number portability has given customers an unprecedented level of control over toll-free services, users are in for a shock if they think they have complete control over their numbers.

Since portability allows customers to move 800 numbers freely between carriers or even use more than one carrier at a time, there is a common perception that users own their 800 numbers.

But the regional Bell holding companies have always barred ownership of phone numbers and are maintaining that policy under portability.

A user has no right to transfer or sell its 800 number to another user. That raises questions about a user's ability to transfer an 800 number as part of a business merger, the length of time a user may hold an unused 800 number and under what circumstances a carrier may disconnect an 800 number for suspected abuse of the tariff.

There are also legal questions about whether customers can use a so-called 800 vanity number if it spells out a slogan or name that is trademarked by another company.

"This is an area in which there is much more lore than law," said Henry Levine, a telecommunications attorney here. Users' rights are not likely to become clear until the issues are fought out in court, he said.

Greg Vogt, chief of the Federal Communications Commission's tariff division, agreed. "We don't

See **800 portability**, *page 69*

MULTIPROTOCOL NETS

No respect: SNA gets short shrift from routers

BY MAUREEN MOLLOY

While it is clear that IBM Systems Network Architecture traffic is rapidly becoming just another passenger on LAN-based enterprise internetworks, SNA still demands preferential treatment due to its critical nature and acknowledgment requirements.

Oddly enough, the protocol prioritization capabilities of the two leading router vendors, designed to ensure that SNA gets first dibs on bandwidth, can't always guarantee the traffic top billing.

In the schemes pushed by Cisco Systems, Inc. and Wellfleet Communications, Inc., bridged SNA traffic is given priority over routed protocols, but SNA's primacy is not assured when other nonroutable protocols are vying for the network.

That is because Cisco and Wellfleet routers are incapable of differentiating between SNA and Network Basic I/O System packets, both of which use IBM's source route bridging (SRB) technology.

Recent tests performed by InterLAB, an independent network testing laboratory in Sea Girt, N.J., showed that Cisco and Wellfleet routers view all SRB traffic as a single protocol. The routers had no way of knowing whether the SRB packets contained mission-critical SNA LU

See **SNA**, *page 68*

NETWORK WORLD'S R.A.F. READER ADVOCACY FORCE

Briefs

Score one for AT&T. The Supreme Court last week said it would not review a lower court decision that struck down the Federal Communications Commission's forbearance policy, which allows nondominant carriers such as MCI Communications Corp. to file tariffs with a range of prices rather than specific charges. AT&T is now suing to force MCI to file tariffs with specific charges. Arguments will be heard June 30.

Apple to kick up storm at PC Expo. Behind closed doors at PC Expo in New York this week, Apple Computer, Inc. will preview two new Macintosh models, code-named Cyclone and Tempest, equipped with 32-bit digital signal processors (DSP). The DSPs give the Macintoshes a variety of capabilities, including support for speech recognition, telephony and multimedia functions. The machines will have a software-controlled port that can deliver high-speed modem functions and attach to facsimile machines, private branch exchanges, Integrated Services Digital Network links and packet-switched data nets. Slated to ship this summer, 68040-powered machines will be priced from $2,300.

4.0 gets SNA ready. Novell, Inc. last week announced "compatibility modules" that give its NetWare for SAA, NetWare HostPrint and NetWare SNA Links products support for NetWare 4.0 networks. The modules are available now on NetWire at no charge.

EDS and Amdahl tool around. Amdahl Corp. and Electronic Data Systems Corp. (EDS) last week announced a joint venture called Antares Alliance Group that will develop and sell mainframe-caliber client/server development tools. The company, which is 80% owned by Amdahl and 20% owned by EDS, will initially sell Amdahl's Huron application development environment and EDS' InCase data modeling tool. The two will eventually integrate their products and port them to numerous platforms, including Microsoft Corp.'s Windows, SunSoft, Inc.'s Solaris and IBM's OS/2 and AIX. The Dallas-based Antares will employ approximately 300 people when it officially opens July 1.

EC balks at telecom competition. The European Community (EC) has backed off early proposals calling for competition on international direct-dial calls by 1996, calling instead for competition to begin in January 1998. The decision only covers the EC's largest nations.

Oracle files libel suit. Oracle Corp. last week filed a defamation and libel lawsuit against The Standish Group, a small Yarmouth, Mass., research firm. The suit is in response to recent Standish Group charges that Oracle issued misleading and fraudulent benchmark test results for its Oracle7 database. "The Standish Group's claim that Oracle 'cheated' on its benchmarks is wholly unfounded," said Ken Jacobs, vice president of the product planning, database and languages division at Oracle. Standish Group Chairman Jim Johnson said Oracle's lawsuit is "tantamount to coercion and nothing more than legal blackmail."

Army drafts IBM. The U.S. Army Information Systems Selection and Acquisition Agency last week awarded IBM's Federal Systems Co. a contract valued at as much as $474 million to install an open systems-based network that will automate the Army's day-to-day functions in logistics, finance, personnel and training. IBM will build a client/server-based net using NCR Corp. 3000 Series and IBM RISC System/6000 machines as well as more than 90 applications based on off-the-shelf software.

Contacts

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Network World tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Susan Collins at (800) 622-1108, via fax at (508) 820-3467 or via the Internet at scollins@world.std.com.

I'm trying to connect Apple Computer, Inc. Macintoshes running DEC Pathworks Version 1.1 and DOS personal computers to the same Ethernet printer. The network software I'm using is Digital Equipment Corp.'s Pathworks 4.0. The preferred printer is a Hewlett-Packard Co. IIIsi with PostScript fonts, but other printers can be considered. How do I do this?

Kevin Baird, Fairfax, Va.

Network World *contacted DEC's PC Integration Product Marketing Group, which provided the following response:*

It is certainly possible for Macintosh and DOS users to share the same PostScript printers on Ethernet via Pathworks. For each of its software products, DEC publishes a Software Product Description (SPD) and System and Software Addendum (SSA), which lists all the printers that DEC guarantees to work with the software.

For DOS users, these printers are listed in the SPD SSA for Pathworks for OpenVMS server software; for Macintosh users, these are listed in the SPD SSA for Pathworks for OpenVMS (Macintosh) server software. Your best bet is to choose a printer common to both.

If the configuration you choose is "unsupported," you may still find other users who have gotten your configuration to work by investigating the DECPCI forum on CompuServe or the DECUServ forum of the DEC Users Society. For more information on DECUServ, contact DEC customer service at (508) 841-3914.

I'm running Novell NetWare 3.11 on an IBM 4M bit/sec Token Ring. I have a packet burst NetWare Loadable Module (NLM) loaded at the file server. Every time I use the latest NETX.EXE or BNETX.EXE shell, I receive the following message at the file server console: "NCP request received with invalid security signature — possible intruder or network corruption." I also receive the following error at the

See Help desk, *page 39*

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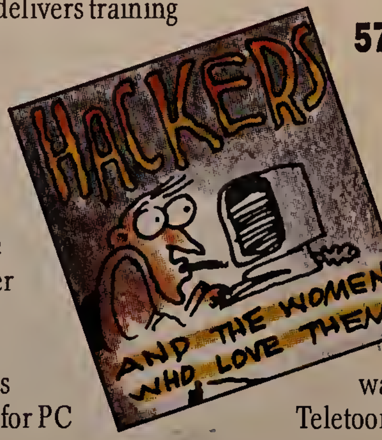

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Tunneling debate set for Mactivity

Wanted: AppleTalk over TCP/IP standard.

BY FREDRIC PAUL

San Jose, Calif.

Apple Computer, Inc., Cayman Systems, Inc., Farallon Computing, Inc. and Shiva Corp. plan to submit proposals for tunneling AppleTalk through TCP/IP networks at the first meeting of the AppleTalk Networking Forum (ANF), to be held on the eve of the Mactivity '93 conference here this week.

The ANF, a nonprofit entity established last fall to promote interoperability among AppleTalk products, will establish a working group charged with formulating standards from the proposals.

"Tunneling is a very hot topic at the moment," said Jonathan Wenocur, ANF president and chairman of the board. But the ANF will also charter working groups to study zone name changing, transport-independent AppleTalk services and AppleTalk application program interfaces on Windows.

According to Doug Cayne, group vice president and general manager of Gartner Group, Inc.'s Bay Area Research Center in Santa Clara, Calif., tunneling is particularly critical in trying to integrate AppleTalk into the enterprise.

Apple plans to submit its AppleTalk Update Routing Protocol (AURP), which is already available on the Apple Internet Router (*NW*, Jan. 11, page 4). Garry Hornbuckle, Apple's networking evangelist, said, "We believe that AURP meets the needs of large enterprises for building scalable AppleTalk nets."

Farallon will fall in line by announcing that its InterRoute/5 and StarRouter hardware will support AURP. Free upgrades for the products will be available in July.

But Shiva will announce TunnelTalk, an implementation of the so-called Dr. Pepper IP tunneling specification, a functional subset of AURP developed by the founding members of the ANF.

Shiva will include TunnelTalk in its K-Star 9.2, a software upgrade kit for its FastPath 5 LocalTalk-to-Ethernet gateway. The upgrade costs $199.

Cayman, meanwhile, will propose its own Traffic Reduced Encapsulation of DDP in IP (TREDI) protocol, which offers backward compatibility with the company's existing Simple Encapsulated of DDP in IP (SEDI). TREDI will be included in Cayman's next release of system software on its GatorBox and all future router and gateway products.

Other router and gateway vendors in the Macintosh market are supporting one or another of these standards or waiting on the fence for the market — or the ANF — to establish a standard.

Wellfleet Communications, Inc., for example, is committed to supporting AURP but won't ship product until the third quarter. 3Com Corp. is not yet pushing a particular standard.

Despite charges by some vendors that AURP's network number remapping can cause problems in large networks, an aura of cooperation — not animosity — has so far prevailed at the ANF.

Most companies have pledged to support whatever emerges from the ANF, and many observers expect the ANF to endorse more than one approach. According to Apple's Hornbuckle, who is also on the ANF board, "The problem is not a lack of technology, but a richness of choices." Z

ODS, Newbridge ally on ATM

BY SKIP MACASKILL

Richardson, Texas

Optical Data Systems, Inc. (ODS) this week will cast its Asynchronous Transfer Mode (ATM) lot with Newbridge Networks Corp. when the two companies enter into a strategic technology alliance.

By incorporating Newbridge's Vivid Ridge and ATM switching technologies into its Infinity intelligent hub line, ODS will enable users to integrate Ethernet, token-ring and Fiber Distributed Data Interface local-area networks into ATM campus backbones.

The Newbridge technology will debut in the hub as the ATM Express module, which will occupy two slots in either the four-, seven- or 12-slot Infinity hub.

One side of the module contains both the ATM switch controller, which handles the call setup procedures, and the matrix switch, which has a 2.4G bit/sec capacity, as well as four input ports and four output ports.

The other half comprises daughterboard card slots for the LAN and wide-area network interfaces. One daughtercard slot houses a LAN-to-ATM adapter, which supports Ethernet, token-ring and FDDI connections, features Newbridge's Vivid technology that performs the actual segmentation and reassembly of LAN packets into ATM cells and vice versa.

An ATM-to-trunk line adapter resides in the other daughtercard slot and supports a variety of connections to Newbridge's MainStreet WAN ATM switch, including T-1, T-3, Synchronous Optical Network (SONET) Optical Carrier (OC)-3 and OC-12. Cards are also available for single-mode and multimode 100M and 140M bit/sec connections.

According to Joe Head, senior vice president of ODS, keeping sight of the traditional LAN users was a priority for the hub maker. "Our top concern was preserving our users' installed base while providing a migration path to ATM," he said.

"We decided to go with Newbridge because there was no comparison of the capabilities it offers today with the future promises its competitors are making," Head added.

While the ATM Express is a self-contained unit that will require no physical changes to the Infinity hub, if the user wanted to increase the size of the switch from four inputs and four outputs to a 16-by-16 version, they could install additional modules. In order for the switches to communicate, a new 20G bit/sec ATM backplane would have to be added to the Infinity.

ATM MANAGEMENT

Since both Newbridge's ATM management software and ODS' hub management software currently run on top of SunConnect's SunNet Manager net management system, users can employ that platform to manage the ATM environment supported by the Infinity.

Those management capabilities will also be available on Hewlett-Packard Co.'s OpenView and IBM's NetView/6000 platforms as soon as Newbridge's ATM software is ported to them. Specific time frames were unavailable.

The ATM Express module will be available by the end of the third quarter. Pricing ranges from $12,000 to $15,000, depending on configuration.

The Ethernet interface daughterboard cards are available now, with the token-ring and FDDI models available in the third and fourth quarters, respectively.

The 100M and 140M bit/sec trunk line interfaces as well as the T-1 interface are available now, while the SONET OC-3 and OC-12 will be available in the fourth quarter and second quarter of 1994, respectively.

☎ Newbridge: (703) 834-3600; ODS: (214) 234-6400.

IBM offers up Ethernet cards, Token-Ring wares

BY SKIP MACASKILL AND CHRISTINE BURNS

White Plains, N.Y.

The industry's first full-duplex Ethernet adapter card highlighted a 20-product splash by IBM last week.

Sharing the spotlight were IBM's first Token-Ring Extended Industry Standard Architecture (EISA) adapter card and several enhancements to its Token-Ring bridge and LANStreamer adapter card lines.

IBM's new 32-bit EtherStreamer MC 32 Adapter is the first adapter that allows workstations and servers to operate in full-duplex mode, meaning its transmit and receive channels can each operate at 10M bit/sec simultaneously.

The adapters, which will initially work with Micro Channel Architecture (MCA)-based machines, complements similar functionality for hubs and Ethernet switches that were recently announced by several vendors, including Cabletron Systems, Inc., Kalpana, Inc. and SynOptics Communications, Inc.

Those vendors touted the technology as a good fit for communications between departmental and data center hubs and switches because it eliminates collisions and allows information to be exchanged more quickly. The IBM card now extends those same benefits to workstations and servers exchanging data.

IBM LAN splash

Product	Availability	Price
8222 Ethernet 6-port Workgroup Hub	July 30	$345
EtherStreamer MC 32 Adapter	July 30	$595
LANStreamer MC 16 Adapter	Now	$645
LANStreamer Token-Ring Bridge/ DOS Version 1.0	July 30	$1,995
Token-Ring LAN Bridge Manager/2	July 30	
DOS Agent Component		$95
OS/2 Version 1.0		$495
Local Token-Ring Bridge/ DOS Version 1.0	July 30	$1,495
Remote Token-Ring Bridge/ DOS Version 1.0	July 30	$2,495
Token-Ring 16/4 EISA Adapter	Now	$720
8250 Intelligent Hub-Model 06S from Chipcom Corp.	July 16	$1,780
AIX Intelligent Hub Management Program/6000		
Version 1.2	Sept. 24	$8,400
Entry Version 1.2	Sept. 24	$4,500
FDDI adapters (10 models) from SK Group of Companies	July 30	$700 to $1,700 each

GRAPHIC BY SUSAN SLATER

SOURCE: IBM, WHITE PLAINS, N.Y.

Full-duplex capabilities in a server, for example, would allow it to transmit information to one user while receiving a request from another.

IBM has also supplemented its Token-Ring adapter line with the addition of a 16/4 EISA adapter and a 16-bit LANStreamer MC adapter.

The 16/4 Busmaster EISA adapter is IBM's first Token-Ring adapter that operates with an EISA bus.

The 32-bit direct memory access (DMA) bus master adapter supports IBM's EISA Version 3.21 and connects to 4M or 16M bit/sec Token-Ring Networks. It provides at least 40% greater file-transfer performance and reduces host CPU utilization by up to 80% compared to previous adapters, IBM said.

With its LANStreamer MC 16 Adapter, IBM is offering a 16-bit low-end client-based cousin to its 32-bit LANStreamer MC 32 server-based adapter. The MC 16, which has a DMA bus master architecture, provides the same performance for OS/2 MCA-based client workstations as the MC 32 provides for servers — processing as many as 48,000 16-byte frame/sec and offering throughput of up to 14.3M bit/sec over 16M bit/sec Token-Ring local-area nets.

In terms of networking features, the MC 16 adapter provides multiple group addressing, which allows files to be broadcast to selected workstations on the LAN, and priority transmit channels, which create a path for high-priority traffic such as multimedia.

Both the LANStreamer and EISA adapters support unshielded and shielded twisted-pair wiring, with driver support for Microsoft Corp.'s Network Driver Interface Specification, OS/2 LAN Manager, DOS and Novell, Inc.'s NetWare.

Designed to work with the LANStreamer 32-bit adapter, the new LANStreamer Token Ring Bridge/DOS Version 1.0 provides high-performance throughput — as fast as 25,000 64-byte packet/sec running in a 386-based personal computer — and increases the maximum source route bridging hop count from seven to 13 by using an expanded addressing field.

Kevin Tolly, president of InterLAB in Sea Girt, N.J., said IBM's Token-Ring bridge program has trailed industry leaders during the past few years.

Use of the LANStreamer adapter, which was beta-tested at InterLAB, will "catapult the IBM bridge program back to the top of the heap," Tolly said.

The Local Token Ring Bridge/DOS Version 1.0 replaces the current local bridge program product, the $1,795 Token-Ring Network Bridge Program 2.2, which included both local and remote bridge functions. The new product works only as a local bridge but costs just $1,495.

The new Remote Token Ring Bridge/DOS Version 1.1 offers improved performance through enhanced buffering of bursty traffic and support for the E-1 line speed of 2.048M bit/sec, up from the T-1 rate of 1.544M bit/sec.

The LAN Bridge Manager/2 Version 1 is a new product that lets users remotely install, set up and manage IBM Token-Ring bridges from a LAN Network Manager console.

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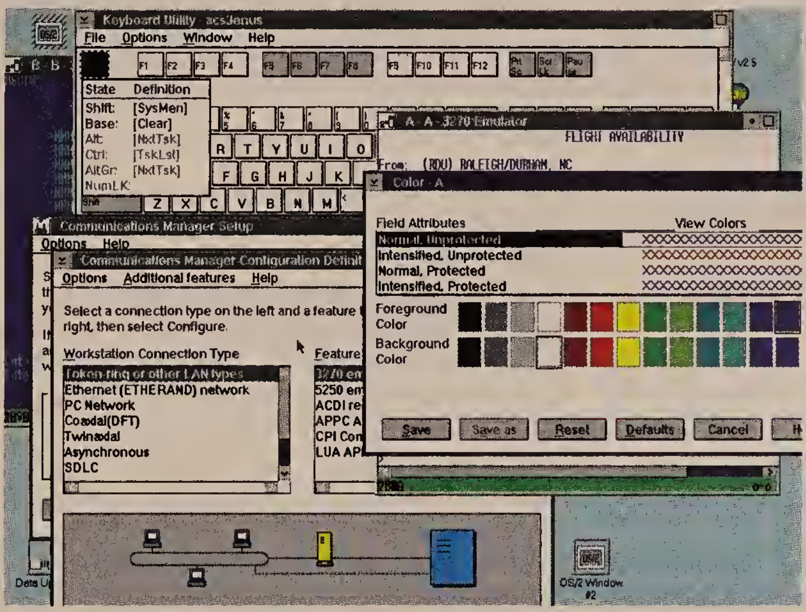

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IBM adds APPC wares, APPN licensing fees

BY MICHAEL COONEY

Raleigh, N.C.

At its APPC/APPN Platform Developers Conference last week, IBM announced products that represent new building blocks for its peer-to-peer networking foundation and a new licensing fee for vendors building APPN products.

The products include IBM's first LU 6.2-based file-transfer offering, a software package that lets 3270 devices utilize LU 6.2 sessions and new tools that make Advanced Peer-to-Peer Networking nets easier to configure.

IBM also announced an End Node Technology Offering that will let vendors that have or are planning to implement APPN Low Entry Networking (LEN) or End Nodes (EN) license APPN patents, trademarks and copyrights for $5,000.

The first of the new products, which IBM originally outlined late last year (*NW*, Dec. 7, 1992, page 1), is Discovery Architecture software. The software will let any PU Type 2.1 node, such as an OS/2 machine, automatically find and report to primary or backup Network Nodes (NN) linked on an IMB Token-Ring local-area network.

APPC is IBM's application program interface to underlying LU 6.2 peer-to-peer data transport services. NNs and ENs make up APPN, IBM's dynamic peer-to-peer communications technology. LEN nodes are slightly less functional than ENs in terms of communications and configuration features.

Currently, when users install an EN in an APPN net, they have to program its logical unit name and communications paths to the nearest NN, said Peter Schwaller, senior associate programmer in IBM's APPC Market Enablement Group. Discovery Architecture software performs that function automatically and finds a backup NN if the EN loses the connection to the primary for any reason.

IBM is now offering Name Server code that lets users employ shorter, more recognizable nicknames for devices instead of the official logical unit name.

IBM also announced APPC3270 software code that will, for the first time, let 3270 devices, or personal computers emulating 3270, run 3270 data over LU 6.2 sessions. PCs emulating 3270s or plain 3270 devices cannot utilize LU 6.2 sessions today.

The APPC3270 program will be offered in addition to IBM's Dependent LU Server/Requestor feature for PCs and terminals linked to 3174 controllers.

Finally, IBM announced the APPC File Transfer Protocol (AFTP) software, which will let users transfer files between PCs running AFTP or between PCs and the mainframe using LU 6.2 sessions.

Discovery Architecture, Name Server, APPC3270 and AFTP are all sold as source code that IBM, developers and users can implement. AFTP will be available in September for $10,000, while the others will ship in October for $5,000 each.

"We think these features will be straightforward to implement, and users could see products early in 1994," said Miles Ulrich, manager of Systems Network Architecture technology at Wall Data, Inc. an SNA software provider in Redmond, Wash.

In announcing the $5,000 End Node Technology Offering, IBM squelched a potential vendor outcry concerning licensing fees that some feared would be as high as $25,000.

"We think [$5,000] is a reasonable amount to pay for intellectual property," Ulrich said. "It's a positive sign that IBM is listening to the vendors."

Added Anura Guruge, an independent strategic analyst in New Ipswich, N.H., "I was delighted to see that IBM is finally on the right track with this patent arrangement."

☎IBM: (800) 426-2468.

HP offers OLTP pack based on Transarc system

BY WAYNE ECKERSON

Palo Alto, Calif.

Diving into the Unix-based on-line transaction processing (OLTP) market, Hewlett-Packard Co. last week introduced client/server OLTP software that runs on the Open Software Foundation, Inc.'s Distributed Computing Environment (DCE).

HP also announced enhancements to its DCE implementation, called HP DCE/9000, that provide additional security and administrative capabilities.

Rather than building its own OLTP system, HP licensed technology from Pittsburgh-based Transarc Corp. called Encina and ported it to HP's 9000 Series Unix processors. HP Encina/9000 runs on top of HP-UX, HP's version of Unix, and DCE/9000.

"HP has realized they can't just deliver DCE; they have to deliver tools that use DCE."

HP Encina/9000 extends DCE with transaction processing features designed to maintain the integrity and accuracy of data within high-volume transaction environments.

These features include two-phase commit, which ensures the integrity of data when a node fails during a transaction, and transactional remote procedure calls, which provide reliable communications between distributed nodes.

"Encina is critical to HP's DCE strategy. HP has realized they can't just deliver DCE; they have to deliver tools that use DCE," said John Morrell, manager of Unix software research at International Data Corp., a research firm in Framingham, Mass.

But John Mann, senior analyst at The Yankee Group in Boston, said HP has some work to do before it becomes a major player in transaction processing systems. Mann also said HP will need to address areas of security and systems management, which are critical in OLTP environments, in order to make HP Encina/9000 a robust, full-fledged offering.

HP Encina/9000 consists of client and server software and a transaction monitor. The client software, which runs on HP 9000 workstations, enables client applications to participate in transactions.

The server software maintains data integrity by logging all transactions, locking target records while a transaction is in process and backing out transactions in case of a failure. It will support two transaction monitors — the Encina/9000 Monitor, based on Transarc technology, and HP CICS/9000 Monitor, based on IBM's CICS. The Encina/9000 Monitor is available now, while HP expects to ship CICS/9000 later this year.

Transaction monitors manage the flow of transactions to be executed within one or more databases. Encina/9000 works with Unix databases conforming to X/Open Company, Ltd.'s XA interface.

HP offers an optional module, called the Encina/9000 Program-to-Program Communications (PPC) Executive, which allows programmers to use

See OLTP, *page 68*

Novell intros NetWare bundle for branch offices

BY CARYN GILLOOLY

Sunnyvale, Calif.

Novell, Inc. last week brought out two packaged versions of its existing network operating system, wide-area connectivity and management products designed to make it easier and less expensive for users to install LANs at branch sites.

The products, called NetWare SNA Branch Office and NetWare Internetworking Branch Office, are the first to debut under Novell's new NetWare Branch Office Solutions umbrella. Each package is designed to be installed, administered and managed from a remote central console.

NetWare SNA Branch Office consists of a 20-user version of NetWare 3.11 or a 25-user version of NetWare 4.0 plus NetWare for SAA 1.3, NetWare Global MHS 2.0, NetWare SNA Links 1.0, NetWare Hub Services 2.0 and the Network Management Agent 1.5. It lets users install remote local-area networks that can connect to IBM mainframe resources, said Bernard Harguindeguy, marketing manager at Novell's Interoperability Systems Group here.

The internetworking package includes the same services as the Systems Network Archicture version, but substitutes Novell's NetWare Multiprotocol Router Plus 2.1 for the NetWare for Systems Application Architecture and NetWare SNA Links products, enabling the LAN to be connected to a multiprotocol internetwork backbone.

The complete package of services will all run on a single server at the branch office. With the Network Management Agent included in each package, the central administrator will be able to manage the entire remote office through the company's central management console /Netware managment system.

Each package will also come with a Network Navigator Agent that works in conjunction with Novell's Network Navigator application to let an administrator at a central management console remotely install the system and provide software updates.

According to Harguindeguy, some of Novell's largest corporate customers had been asking for some sort of "cookie-cutter approach" for deploying LANs in branch offices. "IS has one big goal: to eliminate IS people in branch offices and manage everything from the company headquarters," he said.

Prices for the bundles will start at $4,995. Customers should contact their local Novell reseller for more information.

CUTTING COSTS

AT&T proposes new fractional T-1 pricing

BY BOB WALLACE

Basking Ridge, N.J.

AT&T last week announced a new discount pricing plan for its fractional T-1 service and lowered the monthly usage commitment on its discount plan for customers that employ multiple dedicated services.

The carrier's new Accunet Select Savings Plan offers users that sign one- to five-year contracts discounts of up to 7% off AT&T's Accunet Spectrum of Digital Services (ASDS) rates.

At the same time, AT&T is lowering, from $5,000 to $2,000, the monthly charge for users that sign up for its Multi-Service Volume Pricing Plan (MSVPP), which offers discounts on all AT&T private-line services.

"We've seen a large growth in the number of customers that use ASDS," said Joe Lueckenhoff, product-line manager for AT&T's Accunet services. "We developed the [new] plan because these users are willing to sign term plans."

The Accunet Select Savings Plan gives ASDS users that sign a 12- to 23-month term plan a 5% discount on the interoffice channel (IOC) part of the link and a 3% discount on dedicated access.

Those who sign a 24- to 35-month plan get a 6% discount on the IOC and 4% off dedicated local access, while users that agree to a 36- to 60-month contract receive a 7% discount on the IOC and 5% on dedicated local access.

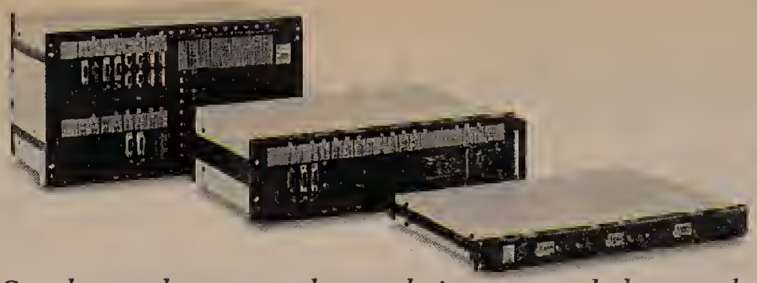
The plan guarantees the discounted price for the length of the user's contract, whereas rates for services can change under a MSVPP, Lueckenhoff said. It also discounts service on a per-link basis, meaning users that have only a few links can still qualify for discounts, he explained.

Companies that sign up for the Accunet Select Savings Plan and later add other AT&T private lines can move up to MSVPP without penalty. That plan covers AT&T's ASDS, Dataphone Digital Service, T-1, fractional T-3 and T-3.

AT&T also wants to lower the entry threshold for MSVPP. The minimum monthly usage commitment for MSVPP has been lowered from $5,000 to $2,000. The new plan, however, does not require a minimum monthly usage requirement.

Under MSVPP, a two-year contract carries a 16% discount, while a three-year deal offers a 17% discount.

☎AT&T: (800) 248-3632.



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Circle Reader Service #17

UB targets token-ring in hub product rollout

BY SKIP MACASKILL

Santa Clara, Calif.

Ungermann-Bass, Inc. last week rolled out three new token-ring products for its Access/One intelligent hub line, including a high-density concentrator module, a multiport bridge/router module and a management application that identifies potential network problems.

The new ASM420 Token Ring Concentrator is a 24-port module for the Access/One that supports 4M or 16M bit/sec token ring and shielded or unshielded twisted-pair wiring. As many as 10 ASM420s can be used in the Access/One, supporting 220 devices across 10 token rings.

It also supports Beacon Avoidance, which denies ring access to a device if certain error conditions exist, such as a speed mismatch. Another feature, Per-Port Retiming, reduces jitter by retiming the token-ring signal as it leaves each port.

Available in September, the ASM420 costs $2,795.

Complementing the module is the Reduced Instruction Set Computing-based ASM5530 Access/Plus Multiport Token-Ring Bridge/Router, an Access/One module that supports one Ethernet and two token-ring interfaces.

It offers local bridging and source route bridging between ports on the same board or token-ring ports on another ASM5530 in the same hub. It will also support translational bridging to Ethernet and Fiber Distributed Data Interface nets, with performance running between 10,000 and 12,000 packet/sec for 64-byte packets.

The local routing capabilities, to be available by year end, include support for the Transmission Control Protocol/Internet Protocol, AppleTalk I and II, DECnet IV, Novell, Inc.'s Internetwork Packet Exchange (IPX) and Xerox Corp. Xerox Network Systems.

Available in September, the ASM5530 costs $9,000.

UB also unveiled Network Early Warning System, a firmware upgrade that resides on the ASM420 and offers three management applications. Resource Activity Monitoring enables users to set thresholds that trigger alarms when exceeded. Critical Resource Monitoring allows the net manager to deem any port as critical, with an alarm sent if the port's connection fails. Intruder Guard permits one valid media access control address to be assigned to each device. If an unauthorized station connects to the port, an alarm is generated and the port is disabled.

The firmware will be available in September for $295.

✆ UB: (800) 777-4526.

3Com enhances NETBuilder

BY MAUREEN MOLLOY

Santa Clara, Calif.

3Com Corp. last week announced enhancements for its low-end NETBuilder Remote Control router — better known as the Boundary Router — that will make it easier for users to link smaller sites into their internetworks.

What's more, 3Com said it will triple the port capacity of its top-of-the-line NETBuilder II router, enabling it to support more links to remote routers, and will offer by year end a new family of low-cost, low-end routers — although the firm was closemouthed on details about the new devices.

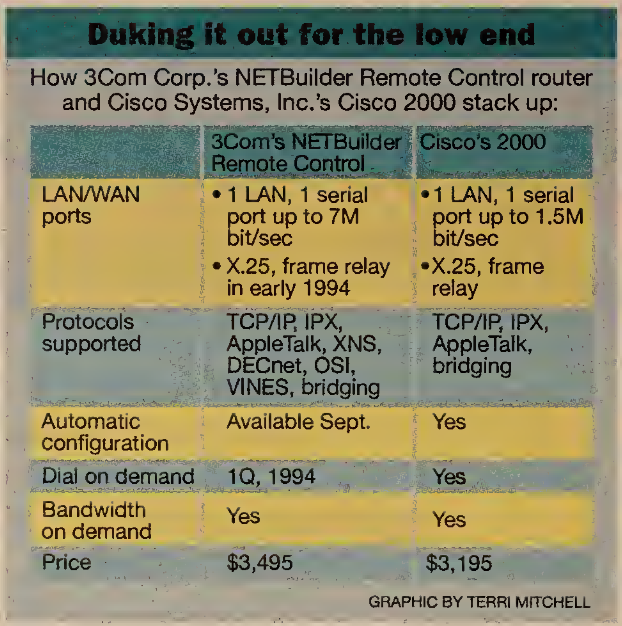
The announcements came as rival Cisco Systems, Inc. moved aggressively into the low-end of the router arena with the introduction of its Cisco 2000 (see page 11 and *NW*, June 21, page 1). As predicted, word of the router giant's plans sparked activity among competitors vying for shares of the lucrative low-end market.

Along with 3Com's moves, Network Application Technology, Inc. last week cut the price of its two-port LANB/290 IP router to $1,995 and said it will add support for Novell, Inc.'s Internetwork Packet Exchange (IPX) protocol to the device in the fall. In addition to bridging, the device currently supports Transmission Control Protocol/Internet Protocol routing only. Customers that buy the LANB/290 before Sept. 1 will get IPX support at no charge.

Val Shribar, a senior network analyst at META Group in Reston, Va., said all this activity is not surprising. "I'm hard-pressed to find a Fortune 500 company or any vertical industry that doesn't have a need to extend its LAN internet highway out to the country roads," Shribar said.

To win in the low-end of the market, vendors have to address user requirements for low price, simplicity and centralized net management, he added. "Pricing is critical because of the multiplier factor. Whatever the cost of the box is, you need to multiply that by 50, 100 or even 1,000."

In that vein, 3Com will enhance its NETBuilder Remote Control router with new centralized and automatic configuration and management capabilities. In September, the company will offer software that enables users to download configuration information from a central site to Boundary Routers. Configuration information currently must be loaded from diskettes.



Duking it out for the low end

How 3Com Corp.'s NETBuilder Remote Control router and Cisco Systems, Inc.'s Cisco 2000 stack up:

	3Com's NETBuilder Remote Control	Cisco's 2000
LAN/WAN ports	• 1 LAN, 1 serial port up to 7M bit/sec • X.25, frame relay in early 1994	• 1 LAN, 1 serial port up to 1.5M bit/sec • X.25, frame relay
Protocols supported	TCP/IP, IPX, AppleTalk, XNS, DECnet, OSI, VINES, bridging	TCP/IP, IPX, AppleTalk, bridging
Automatic configuration	Available Sept.	Yes
Dial on demand	1Q, 1994	Yes
Bandwidth on demand	Yes	Yes
Price	$3,495	$3,195

GRAPHIC BY TERRI MITCHELL

By early 1994, 3Com users will be able to furnish remote routers with automatic software updates simultaneously from a central router.

To help control costs, the router early next year will get support for dial-on-demand routing, which lets users employ dial-up facilities as their primary wide-area links. The router, which currently supports serial line wide-area connections, will also be equipped to support X.25 and frame relay by early 1994.

3Com also said it will triple the port capacity on the NETBuilder II from eight to 24 with the rollout this year of multiport Ethernet, token-ring and serial interfaces. The cards will be available in two- and four-port versions.

In addition to lowering the per-port cost of the device by as much as 35%, greater port density will enable users to support a greater number of remote site routers with fewer NETBuilder IIs.

Furthermore, 3Com said it will announce in September a new low-end router family that will be less expensive than the Boundary Router — which costs $3,495 — but declined to provide details.

"We'll be leveraging our manufacturing and distribution channels to redefine what simplicity and price are in this market," said Jeff Thermond, 3Com's director of product marketing for Network Systems Operations.

✆ 3Com: (408) 764-5000.

New breed of wireless LAN to debut at PC Expo

BY FREDRIC PAUL

New York

Wireless local-area networks will take a major step toward fulfilling their potential today, as a pair of competitors introduce dramatically faster and more capable new products at PC Expo here.

"It's a big day in the wireless LAN market," said Eric Zimits, a senior analyst at Volpe, Welty & Co., an investment bank in San Francisco. "Everyone is firing their 2.4-GHz bullets." Proxim, Inc., a leader in wireless LANs, will call its bullet RangeLAN2, while Xircom, Inc., a powerhouse in wired LAN adapters for portable computers, will name its ammunition NetWave.

Both product families share similar architectures, including the use of spread-spectrum frequency-hopping technology that uses the 2.4-GHz to 2.483-GHz band increasing throughput to 1M bit/sec or more, compared to existing products, and support more nodes.

With frequency hopping, signals rapidly jump from frequency to frequency according to a preset hopping sequence, which adds security, power efficiency and resistance to interference in comparison to direct-sequence spread-spectrum, which codes the signal into a carrier signal and spreads it over a specific portion of the frequency band.

NetWave and RangeLAN2 products can be used to connect personal computers directly to one another for use with peer-to-peer LAN or file-transfer software. Those LANs or individual PCs can then be hooked into existing wired Ethernet LANs.

Xircom's NetWave adapters boast a raw data rate of 1M bit/sec and can support 15 to 20 simultaneous channels or overlapping networks, said Phil Belanger, marketing director for Xircom's wireless products. It has an output of 50 to 60m watts and a range of 80 to 200 feet between adapters in typical office environments.

The hottest part of the NetWave line is a $499 Credit Card NetWave Adapter, which fits into a Personal Computer Memory Card International Association (PCMCIA) slot on a notebook or other portable device. It is a one-piece unit with an integrated antenna that extends about a half-inch out of the PCMCIA slot.

There is also a $499 Pocket NetWave Adapter, which attaches to a PC's parallel port, and a $999 NetWave Access Point, a book-size device that holds a Credit Card NetWave Adapter and an Ethernet adapter to provide access to wired LANs. The products will ship in the fall.

Xircom also plans to offer its NetWave technology for licensing to other vendors and will announce a series of business relationships with companies including Advanced Micro Devices, Inc. in Santa Clara, Calif., Britain's GEC-Plessey Telecommunications and possibly NCR Microelectronics Products Division.

"Clearly, there will be more [supporters] as we move up the food chain," Belanger said, including OEM deals with notebook vendors and support from bridge and router companies.

Proxim's RangLAN2 line operates at a slightly faster 1.6M bit/sec raw data rate with a 100 mwatt power output, delivering a range of 300 to 500 feet in typical office environments. RangeLAN2 offers a maximum of 10 simultaneous channels.

The line comprises the RangeLAN2/ISA for desktop PCs and servers, the RangeLAN2/PCMCIA for portables equipped with a PCMCIA slot and the RangeLAN2/Bridge for connectivity with wired nets. The current PCMCIA version is a two-piece model, requiring an external antenna about the size of a cassette tape. David King, Xircom vice president of marketing, said the company is working on a one-piece PCMCIA unit and adapters for parallel port connections and Macintosh PowerBooks.

The RangeLAN/ISA is due to ship in the third quarter for $595, while RangeLAN/PCMCIA will be available in the fourth quarter for $695, and RangeLAN/Bridge will be available in the first quarter of 1994 for $1,500 to $2,000, depending on configuration. Proxim will offer a trade-up program for users of the existing 242K bit/sec RangeLAN system, which the company will continue to sell for low-end applications.

✆ Proxim: (415) 960-1630; Xircom: (818) 878-7600.

Altair extends its reach

Motorola, Inc.'s Paging and Wireless Data Group this week will announce Altair VistaPoint LR, a longer range version of its VistaPoint wireless bridge for its Altair Plus II wireless networks.

VistaPoint LR extends the range of the original VistaPoint bridge from .15 km to 1.2 km in the U.S. and to 2.1 km in the rest of the world. It also ups the data rate from 3.5M bit/sec to an aggregate of 5.3M bit/sec.

The range is shorter in the U.S. because of Federal Communications Commission regulations limiting effective power output to 1 watt, said Alex Alavi, Motorola's worldwide marketing manager for Altair product operations.

VistaPoint LR will be available immediately for about $15,000.

By Fredric Paul

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Please Answer ALL Questions, Sign and Date the Form.

1 Industry: (check one only)

01. ☐ Manufacturers (other than Computer/Communications)
02. ☐ Finance/Banking
03. ☐ Insurance
04. ☐ Real Estate
05. ☐ Healthcare Services
06. ☐ Legal
07. ☐ Hospitality
08. ☐ Retail/Wholesale Trade/Business Services
09. ☐ Transportation
10. ☐ Utilities
11. ☐ Education
12. ☐ Process Industries (Mining/Construction/ Petroleum Refining/Agriculture/Forestry)
13. ☐ Government, State/Local
14. ☐ Government, Federal
15. ☐ Military
16. ☐ Aerospace
17. ☐ Consultants (Independent)
18. ☐ Carriers
19. ☐ Interconnects
20. ☐ Manufacturers (Computer/Communications)
21. ☐ VAR/VAD/VAN/ Systems Houses
22. ☐ Distributors, Computer Related
23. ☐ Distributors, Communications Related
24. ☐ Other________________________

2 What is your job function? (check one only)

NETWORKING MANAGEMENT
1. ☐ Networking Mgmt.
2. ☐ LAN Mgmt.
3. ☐ Datacom/Telecom Mgmt.
4. ☐ Engineering Mgmt.

MIS MANAGEMENT
5. ☐ MIS, IS, IT Mgmt.
6. ☐ Engineering Mgmt.

CORPORATE MANAGEMENT
7. ☐ Corporate Mgmt. (CIO, CEO, Pres., VP, Dir., Mgr., Financial Mgmt.)
8. ☐ Consultant (Independent)
9. ☐ Other________________________

3 My responsibilities include: (check one only)

1. ☐ LANs/ Internetworking/ WANs
2. ☐ LANs/ Internetworking
3. ☐ LANs
4. ☐ WANs
5. ☐ None

4 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9.
6. ☐ 1
7. ☐ None

5 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. Scope (check one only)
1. ☐ Corporatewide
2. ☐ Multienterprise (consultants)
3. ☐ Departmental

B. Involvement (check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate

4. ☐ None (A or B)

6 Check all that apply in Columns A and B:

A: I am involved in the purchase of the following products/services.
B: I plan to purchase the following products/services in the next year.

Involved / Plan to Purchase

A B LOCAL-AREA NETWORKS
- ☐ 01. ☐ Local-Area Networks
- ☐ 02. ☐ LAN Servers
- ☐ 03. ☐ LAN Operating Systems Software
- ☐ 04. ☐ Superservers
- ☐ 05. ☐ Data Base Servers (Oracle, Sybase, etc).
- ☐ 06. ☐ Terminal Servers
- ☐ 07. ☐ LAN Services
- ☐ 08. ☐ LAN Storage Devices (optical, tape, disk, etc,. including backup systems)
- ☐ 09. ☐ Network Test Equipment
- ☐ 10. ☐ Hubs
- ☐ 11. ☐ Cables, Connectors, Baluns
- ☐ 12. ☐ UPS
- ☐ 13. ☐ Network Adapter Boards
- ☐ 14. ☐ Peer-to-Peer LANs
- ☐ 15. ☐ Wireless LANs
- ☐ 16. ☐ SNMP Network Management
- ☐ 17. ☐ ATM (Asynchronous Transfer Mode)

A B INTERNETWORKING
- ☐ 18. ☐ Bridges
- ☐ 19. ☐ Routers
- ☐ 20. ☐ Gateways
- ☐ 21. ☐ Bridge/Routers
- ☐ 22. ☐ Hubs
- ☐ 23. ☐ Intelligent Hubs
- ☐ 24. ☐ Communications Servers

Involved / Plan to Purchase

A B COMPUTERS/PERIPHERALS
- ☐ 25. ☐ Micros/PCs
- ☐ 26. ☐ Minis
- ☐ 27. ☐ Mainframes
- ☐ 28. ☐ Pen-Based
- ☐ 29. ☐ Laptops
- ☐ 30. ☐ Workstations
- ☐ 31. ☐ Image Processing Workstations
- ☐ 32. ☐ Front-End Processors
- ☐ 33. ☐ Terminals
- ☐ 34. ☐ Printers
- ☐ 35. ☐ Cluster Controllers
- ☐ 36. ☐ Fax Machines
- ☐ 37. ☐ X-Terminals

A B SOFTWARE/APPLICATIONS
- ☐ 38. ☐ Network Management
- ☐ 39. ☐ Micro to Mainframe
- ☐ 40. ☐ Security
- ☐ 41. ☐ Communication/Terminal Emulation
- ☐ 42. ☐ Word Processing
- ☐ 43. ☐ Operating Systems
- ☐ 44. ☐ Business Applications (Finance/Mfg/HR)
- ☐ 45. ☐ Applications Development
- ☐ 46. ☐ Data Base Management
- ☐ 47. ☐ Spreadsheet
- ☐ 48. ☐ Groupware
- ☐ 49. ☐ EDI
- ☐ 50. ☐ E-Mail
- ☐ 51. ☐ Windows/Graphical User Interface
- ☐ 52. ☐ 4GL/Development
- ☐ 53. ☐ Multimedia
- ☐ 54. ☐ Graphics
- ☐ 55. ☐ Utilities

A B WIDE-AREA NETWORK EQUIPMENT/SERVICES
- ☐ 56. ☐ Modems (9.6K bps and over)
- ☐ 57. ☐ Modems (under 9.6K bps)
- ☐ 58. ☐ T-1
- ☐ 59. ☐ T-3
- ☐ 60. ☐ Fractional T-1
- ☐ 61. ☐ Data Switches
- ☐ 62. ☐ SMDS
- ☐ 63. ☐ ATM (Asynchronous Transfer Mode)
- ☐ 64. ☐ Matrix Switches
- ☐ 65. ☐ Packet Switches
- ☐ 66. ☐ Protocol Converters
- ☐ 67. ☐ Diagnostic/Test Equipment
- ☐ 68. ☐ DSU/CSUs
- ☐ 69. ☐ Microwave
- ☐ 70. ☐ Fax Boards/Modems
- ☐ 71. ☐ VSAT
- ☐ 72. ☐ Fiber Optic
- ☐ 73. ☐ Satellite
- ☐ 74. ☐ ISDN
- ☐ 75. ☐ PBXs (over 1000 lines)
- ☐ 76. ☐ PBXs (under 1000 lines)
- ☐ 77. ☐ Automatic Call Distributors
- ☐ 78. ☐ Voice Messaging Systems
- ☐ 79. ☐ Videoconferencing Systems
- ☐ 80. ☐ Voice Response/Processing
- ☐ 81. ☐ Switched Voice
- ☐ 82. ☐ Dedicated Leased Line
- ☐ 83. ☐ Switched Data
- ☐ 84. ☐ Centrex
- ☐ 85. ☐ E-Mail/On-Line Information
- ☐ 86. ☐ Image Processing
- ☐ 87. ☐ Audio Teleconferencing
- ☐ 88. ☐ Local Services
- ☐ 89. ☐ WATS MTs
- ☐ 90. ☐ International
- ☐ 91. ☐ Virtual Networks
- ☐ 92. ☐ Frame Relay
- ☐ 93. ☐ Value Added Services
- ☐ XX ☐ None of the above (1-93)

7 What is the total number of A: LANs B: Workstations/Nodes in your entire organization?

	LANs A		Workstations/ Nodes B
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	9 or Less	☐

8 Which of the following network platforms are currently installed/planned in the next year?

NETWORK ARCHITECTURES

Present Planned
- ☐ 01. ☐ SNA
- ☐ 02. ☐ DECNET
- ☐ 03. ☐ MAP/TOP
- ☐ 04. ☐ TCP/IP
- ☐ 05. ☐ DCA (Unisys)
- ☐ 06. ☐ X.25

Present Planned
- ☐ 07. ☐ NOVELL IPX/SPX
- ☐ 08. ☐ APPC/APPN/LU 6.2
- ☐ 09. ☐ NETBIOS
- ☐ 10. ☐ OSI
- ☐ 11. ☐ APPLETALK
- ☐ 12. ☐ OTHER________________________

LAN OPERATING SYSTEM
- ☐ 13. ☐ LOCALTALK (APPLETALK)
- ☐ 14. ☐ BANYAN (VINES)
- ☐ 15. ☐ DCA (IRMALAN)
- ☐ 16. ☐ DCA (10-NET)
- ☐ 17. ☐ IBM (LAN SERVER)
- ☐ 18. ☐ IBM (PC LAN PROGRAM)
- ☐ 19. ☐ MICROSOFT (LAN MANAGER)
- ☐ 20. ☐ UNGERMANN-BASS (NET/1)
- ☐ 21. ☐ NOVELL (NETWARE, 2.X, 3.X, 4.X)
- ☐ 22. ☐ PROTEON (PRONET)
- ☐ 23. ☐ SITKA (TOPS)
- ☐ 24. ☐ 3COM (3+, 3+OPEN)
- ☐ 25. ☐ ARTISOFT (LANTASTIC)
- ☐ 26. ☐ HAYES (LANSTEP)
- ☐ 27. ☐ DEC (PATHWORKS)
- ☐ 28. ☐ OTHER________________________

LAN ENVIRONMENT
- ☐ 29. ☐ 4M TOKEN RING
- ☐ 30. ☐ 16M TOKEN RING
- ☐ 31. ☐ ARCNET
- ☐ 32. ☐ ETHERNET
- ☐ 33. ☐ STARLAN
- ☐ 34. ☐ FDDI
- ☐ 35. ☐ LOCALTALK
- ☐ 36. ☐ 10BASE-T
- ☐ 37. ☐ OTHER________________________

OPERATING SYSTEM
- ☐ 38. ☐ DOS
- ☐ 39. ☐ UNIX/XENIX/AIX
- ☐ 40. ☐ OS/2
- ☐ 41. ☐ OS/2 2.X
- ☐ 42. ☐ MVS
- ☐ 43. ☐ VM
- ☐ 44. ☐ VMS
- ☐ 45. ☐ MACINTOSH
- ☐ 46. ☐ WINDOWS
- N/A 47. ☐ WINDOWS NT
- ☐ 48. ☐ X WINDOWS
- ☐ 49. ☐ OTHER________________________

9 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ None

10 Which of the following hardware platforms is installed/planned in your company? (check all that apply)

	Mainframes Currently Installed	Planned Next Year	Minis Currently Installed	Planned Next Year
01. DEC	☐	☐	☐	☐
02. IBM	☐	☐	☐	☐
03. AMDAHL	☐	☐	☐	☐
04. AT&T	☐	☐	☐	☐
05. BULL HNIS	☐	☐	☐	☐
06. DATA GENERAL	☐	☐	☐	☐
07. HP	☐	☐	☐	☐
08. TANDEM	☐	☐	☐	☐
09. UNISYS	☐	☐	☐	☐
10. OTHER__________	☐	☐	☐	☐

MICROCOMPUTERS
(fill in the numbers)

	NUMBER INSTALLED	NUMBER PLANNED NEXT YEAR
11. MACINTOSH 20, 30, 40		
12. MACINTOSH OTHER		
13. PCs BASED ON 80586	N/A	
14. PCs BASED ON 80486		
15. PCs BASED ON 80386		
16. PCs BASED ON 80286		
17. PCs BASED ON 8086/8088		
18. RISC / UNIX BASED WKSTNS		
19. OTHER		

11 Estimated value of networking equipment and services:

A. Which you helped specify, recommended or approved in the last year?
B. Which you plan to help specify, recommend or approve in the next year?

A B
- ☐ 1. ☐ $100 million and over
- ☐ 2. ☐ $50 - $99.9 million
- ☐ 3. ☐ $25 - $49.9 million
- ☐ 4. ☐ $20 - $24.9 million
- ☐ 5. ☐ $10 - $19.9 million
- ☐ 6. ☐ $5 - $9.9 million
- ☐ 7. ☐ $1 - $4.9 million
- ☐ 8. ☐ $500,000 - $999,999
- ☐ 9. ☐ $499,999 or less

12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ Over $10 billion
2. ☐ $1 to $9.9 billion
3. ☐ $500 to $999.9 million
4. ☐ $100 to $499.9 million
5. ☐ $50 to $99.9 million
6. ☐ $10 to $49.9 million
7. ☐ $5 to $9.9 million
8. ☐ $4.9 million or less

13 Estimated number of employees for your entire corporation:

1. ☐ Over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ 499 or less

9226

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In this information packed one-day seminar, you will acquire a thorough understanding of the elements of an SNMP-based network management system, how to implement SNMP with your internetwork, plus the various enhancements such as the new message formats, improved error codes and security with SNMP version 2.

A special feature of this seminar are case studies, taken from live networks, and demonstrated with a Network General Sniffer® protocol analyzer.

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- Learn how major vendors are supporting SNMP, including Apple Computer, Cabletron Systems, DEC, Hewlett Packard, IBM, NCR, Novell, and SunConnect.
- Learn the details of the three key elements of the Internet Network Management framework: the SMI, the MIB and the SNMP.
- Survey the key elements of Abstract Syntax Notation One (ASN.1), the language used to define SNMP message formats.
- Understand how TCP/IP and the related Internet protocols such as UDP and IP support SNMP.
- Learn how test equipment that supports the Remote Monitoring (RMON) MIB can assist with distributed LAN management.
- Understand the enhancements found in SNMPv2, such as Manager-to-Manager communications, the GetBulk Protocol Data Unit, and enhanced Security.
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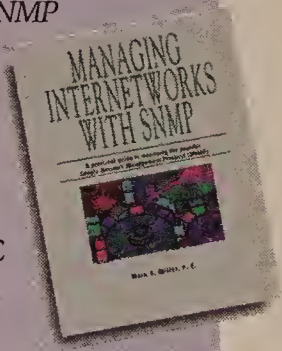

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Circle Reader Service #26

It's peak traffic time…
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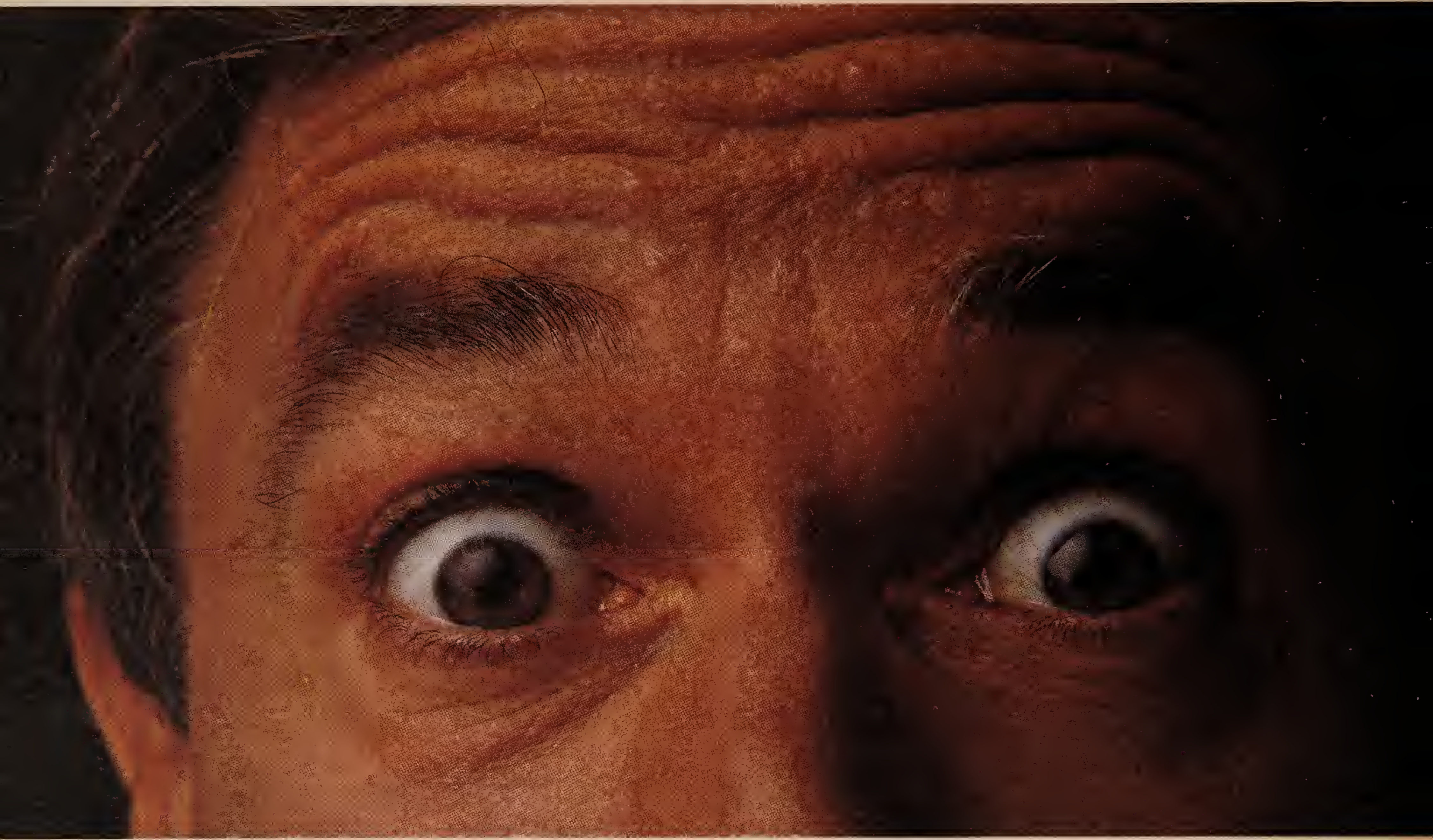

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GlobalView can also function as an SNMP proxy agent, allowing monitoring, control and fault isolation of system elements that would not otherwise be SNMP addressable.

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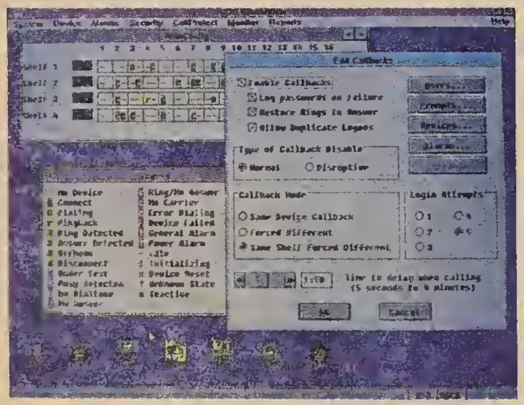

IMPROVED CALL SECURITY and total asset control are important benefits of the GlobalView network management system.

UDS

MOTOROLA

Circle Reader Service #5

ENTERPRISE INTERNETS

Data Network Architectures, Standards, Equipment and Management

BRIEFS

RAD Network Devices, Inc. (RND) last week announced a Fiber Distributed Data Interface module for its OpenGate line of routers.

Called FD1, the module can be housed in either the four-slot OG-C4 or the 12-slot OG-C12 and supports routing of the Transmission Control Protocol/Internet Protocol, DECnet, AppleTalk and Novell, Inc.'s Internetwork Packet Exchange (IPX). It also supports the Open Shortest Path First and Open Systems Interconnection's Intermediate System-to-Intermediate System interrouter protocols, as well as the transparent bridging algorithm.

FD1 is available as either a Class A Dual-Attached Station or a Class B Single-Attached Station, thereby letting users connect it directly to an FDDI ring or to an FDDI concentrator.

It can be managed by any Simple Network Management Protocol-based net management system, including RND's MultiManTM. The module will be available in August and ranges in price from $8,125 to $12,000, depending on whether it is a single- or dual-attached version.

RND: (714) 891-1746.

AT&T last week certified **Ascom Timplex, Inc.**'s TX3/SuperHub System for use with its Accunet Fractional T-3 service. The certification enables TX3/SuperHub System users to save money by employing only the portion of a T-3 line needed to meet their requirements.

Newport Systems Solutions, Inc. last week announced that it has signed international distributor **Ingram Micro, Inc.** to sell its LAN2LAN personal computer-based routers throughout North America. The agreement is effective immediately.

NSS: (800) 368-6533.

Hewlett-Packard Co. and **Synon Corp.** last week announced a joint technology and marketing agreement that will provide cross-platform portability for Application System/400 applications to Unix(R)-based HP 9000 systems. Under the agreement, Synon/Open, a Unix generator option for Synon's AS/400 software development environment, will provide customers with automatic code generation and application customization specific to HP 9000 computing environments.

Using Synon/Open for HP-UX(1), users will be able to run character-based IBM AS/400 applications on HP 9000 systems without changes. Delivery of Synon/Open for HP-UX is scheduled for the fourth quarter.

HP: (408) 447-1665; Synon: (415) 461-5000.

Creative Labs, Inc. last week announced that it is now shipping the Cinepak Codec video compression/decompression software with VideoSpigot for Windows, Creative's digital video capture card for personal computers.

Cinepak, formerly known as CompactVi-

See **Briefs**, *page 15*

IBM, Proginet join forces to bring OSI to the masses

Plan to let OSI apps use SNA, TCP/IP nets.

BY MICHAEL COONEY

Uniondale, N.Y.

Proginet Corp. last week announced that it will add IBM technology to its line of OSI communications software that will enable OSI applications to run over SNA and TCP/IP transport networks.

Proginet will work with IBM to add Big Blue's Multiprotocol Transport Networking (MPTN) technology to its host-based Open Systems Interconnection software, beginning with its Host.FTAM (File Transfer, Access and Management) file-transfer software. Host.FTAM lets IBM MVS mainframe users share files with other OSI FTAM-compliant platforms.

MPTN is IBM software that sits between the data transport and session layers. It uses mapping techniques and algorithms to let various applications run over any underlying transport protocol.

With its first iteration of MPTN products — AnyNet/OS/2 and AnyNet/MVS/ESA — IBM is supporting Systems Network Architecture applications over Transmission Control Protocol/Internet Protocol nets and TCP/IP applications over SNA nets.

"With MPTN support in our Host.FTAM product, users can keep their existing communications backbone and implement an OSI application solution on top of it," said Joe Mohen, president of Proginet.

"Users no longer are limited to picking an application based solely on what communications protocol it supports," he said.

The central component of Host.FTAM is its Open System Server,

See **Proginet**, *page 12*

Cisco's remote access router family

Router family	Office type	Maximum ports	Protocol set
Cisco 4000	Regional	6	All protocols
Cisco 3000	Large branch	4	All protocols
Cisco 2000	Small sites	2	TCP/IP, IPX, AppleTalk, bridging, X.25, frame relay
Cisco 500-CS	Small sites/ individual users	17 (16 asynchronous)	TCP/IP, IPX

SOURCE: CISCO SYSTEMS, INC., MENLO PARK, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

Racal moves net mgmt. technology to HP OpenView

BY MICHAEL COONEY

Sunrise, Fla.

Racal-Datacom, Inc. and Hewlett-Packard Co. last week inked an agreement to integrate Racal Management System (RMS) network management products with HP's SNMP-based OpenView distributed network and systems manager.

The resulting products will provide users with a single, integrated view of Simple Network Management Protocol and non-SNMP devices located throughout their enterprise net.

Under terms of the agreement, the two firms will build management applications that will let RMS products run on top of the HP OpenView system. The combined software will run on the traditional OpenView platform, the HP 9000, as well as a Sun Microsystems, Inc.'s SPARCstation.

"We will combine the best facets of the RMS and HP OpenView to give users control over a wide variety of devices," said Elizabeth Nowell, senior product manager for Racal-Datacom.

The first Racal-Datacom product scheduled to be ported to the OpenView environment is Communications Management Series (CMS) 6000, Racal's Unix-based local- and wide-area network management platform. It monitors and controls everything from Racal-Datacom bridges, routers, modems and T-1 multiplexers to multivendor Ethernet and token-ring LANs.

Once ported to the OpenView platform, the combined application will offer integrated alarms process-

See **Racal**, *page 14*

ROUTERS

Cisco branches out

New line, mgmt. apps to ease deployment of internets.

BY MAUREEN MOLLOY

Menlo Park, Calif.

As expected, Cisco Systems, Inc. last week announced a new low-end router line — dubbed the Cisco 2000 — as well as upgrades to existing products intended to help the vendor attack the burgeoning market for low-cost, easy-to-use routers.

Cisco also unveiled a plug-and-play feature for its entire line of routers that will enable net administrators to automatically download configuration information to the routers at remote sites, all but eliminating the need for technical expertise outside a centralized staff.

The vendor further announced additions to its CiscoWorks router management software line that boost the degree to which router management can be handled remotely.

Frank Dzubeck, president of Communications Network Architects, Inc., a Washington, D.C.-based consultancy, said the key hole in Cisco's product line to date has been its lack of easy-to-use, competitively priced routers for remote users.

"There's thousands and thousands of small offices and mobile users out there that are still virgin territory," Dzubeck said. "Cisco recognizes this and is responding with a whole new class of routers and enhanced management features that address the needs of those users."

KEEPING IT SIMPLE

With its new router line, Cisco is also addressing the requirement to keep router deployment and management simple since most users typically have a dearth of technical expertise at small branches.

Cisco's new remote AutoInstall feature, which will be available on the 2000, 3000 and 4000 routers, essentially enables the router to install itself. The user simply plugs the remote router into the corporate internet via a leased High-Level Data Link Control line, and once booted up, the router automatically learns its net address and downloads all configuration information that has been preprepared at a central site.

That eliminates the need for an expert to install the router or to have the unit shipped to headquarters for configuration. Cisco said a future release of AutoInstall will also support auto configuration over X.25, frame relay, Switched Multimegabit Data Service and Integrated Services Digital Network links.

To further ease router management, Cisco unveiled a new CiscoWorks application that enables users to confine their pool of router experts to a handful of key sites, said Heidi Iacurto, a Cisco product marketing manager.

The application, dubbed Global Command Facility, lets a net administrator set up

See **Cisco**, *page 15*

> **"There's thousands and thousands of small offices and mobile users out there that are still virgin territory."**

Proginet

Continued from page 11

which provides file queuing, monitors errors and tracks files as they cross the net to other FTAM systems, such as those from Digital Equipment Corp. and Tandem Computers, Inc. Users can monitor the file transfer from a central MVS console.

Host.FTAM supports real-time, bidirectional connections and unattended file transfers. Users can also schedule file transfers for transmission during off-peak periods. It requires no additional software or hardware.

Users that have customized Host.FTAM by adding their own extensions will be able to use the new MPTN support without changes to the FTAM applications, Mohen said.

Many OSI applications will ultimately benefit from supporting MPTN, he said. Mohen also said Proginet is at work on software similar to Host.FTAM that would address those applications, although he declined to provide further details.

Analysts said the Proginet MPTN product could help get OSI-based applications into the commercial realm, where they have yet to gain much attention. High costs, complexity and lack of applications have kept OSI products from the commercial markets, they said.

"The product opens up an area to users that they have previously ignored," said John Varanelli, director of operations for the New Science Associates, Inc. consultancy in Southport, Conn. "Users are interested in opening up their networking environments, and this sounds like it will help that effort."

The Host.FTAM product with MPTN support should be available in the fourth quarter. Pricing has not been set.

✆Proginet: (516) 228-6616.

THE INTERNET

by Ed Krol

Learning by hunting

One criticism of the Internet is that resources are hard to find; there is no global directory to aid in searching for the answer to an arbitrary question.

But while it is hard to find information, it's not impossible. Librarians, purveyors of fine information for years, are getting to be quite adept at finding things on the net. In fact, they even do it for fun.

Each month, Rick Gates of the University of California at Santa Barbara library creates a monthly Internet scavenger hunt. It is a list of questions that can be answered using common Internet tools discussed in preceding columns.

At the beginning of each month, Gates electronically mails the questions to a variety of mailing lists and posts them on electronic bulletin boards. Each question is given a number of points determined by its difficulty. In addition, there is usually one "wishful" question for which there is no known answer. Participants ferret out the answers to the questions and E-mail them to Gates.

KROL

Around the second week of the month, Gates distributes the answers and the name of the first respondee with the greatest number of points. If someone knows the answer to the wishful question, it is distributed along with credit to its finder.

If this sounds like fun, here are a few questions from the May hunt to try on your own.

- What is the postal code for Daly Waters, Northern Territory, Australia?
- Who said, "What is the use of the book...without pictures and conversations?"
- I'm writing a paper about how wars conclude. Could you tell me where I can find the terms of the Japanese and German surrenders at the conclusion of World War II?

If you are interested in looking at some of the old hunts and answers, they are available through anonymous ftp to ftp.cni.org in the directory pub/net-guides/i-hunt.

If you want to participate in the new hunts, you can either look there or, more conveniently, on a number of Gopher servers, such as the CICnet Gopher.

But if you don't want to look up the answers yourself, you'll have to wait until next month's column. For those of you who want to try but don't know where to start, here's a hint: Most of the answers can be found using Gopher.

✎Krol is author of *The Whole Internet* (O'Reilly & Associates, Sebastopol, Calif., 1992) and assistant director of LAN deployment at the University of Illinois at Urbana-Champaign. He can be reached at e-krol@uiuc.edu.

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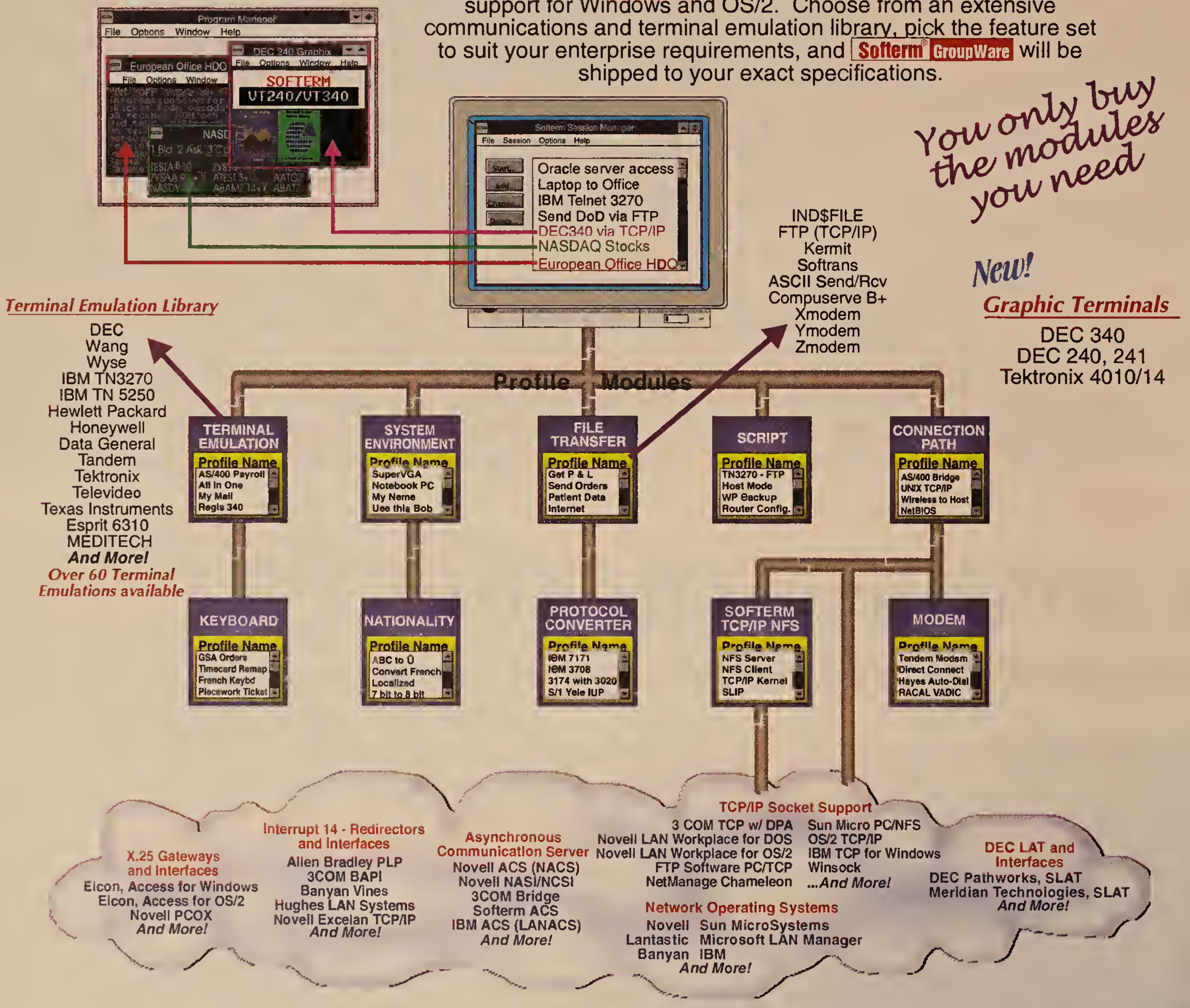

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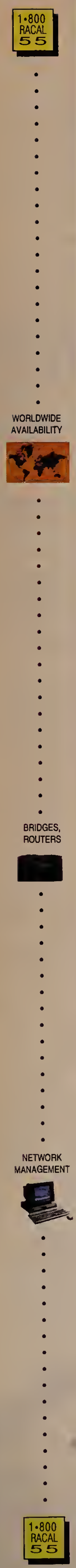

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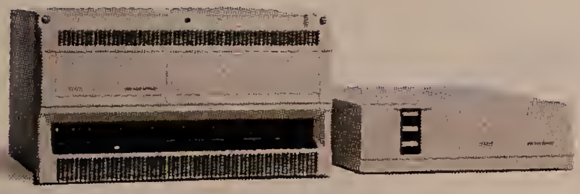

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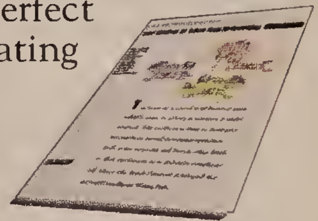

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RACAL

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Circle Reader Service #6

CHANNEL EXTENDERS

Frame relay comes to Computerm extenders

BY MICHAEL COONEY

Pittsburgh

Computerm Corp. last week announced new frame relay support for its Channel Extension System that will let users extend mainframe channels to as many as 16 remote sites over unlimited distances.

In the past, one Computerm channel extender could link up with as many as eight remote extenders over dedicated point-to-point links. Now a single link into a frame relay network lets the mainframe-attached device link to 16 remote sites.

> **"The biggest benefit is bandwidth at a reasonable cost," Sharon Rohrbach said.**

Frame relay also provides access to multiple data routes so data can be routed around link failures if necessary. And bandwidth is allocated on an as-needed basis, so users only pay for what they utilize, said Sharon Rohrbach, vice president of Computerm.

"Those features lower users' line costs and guarantee bandwidth availability for mission-critical applications," Rohrbach said. "The biggest benefit is bandwidth at a reasonable price."

SUPPORT DETAILS

The Computerm channel extender can support up to seven parallel mainframe channels. For remote connections, it supports RS-232 and V.35 interfaces, and wide-area links of up to 512K bit/sec.

A total of 256 remote peripheral devices, such as controllers or printers, are supported by the Channel Extension System. Peripherals can communicate with the mainframe at speeds up to the full 512K bit/sec.

The new Channel Extension System supports another new feature, Computerm's Remote Image Solution, which lets users send and receive high-speed images over the mainframe channel. The feature supports IBM's 3897 Image Capture System, which is used primarily in banking applications for check processing.

The Remote Image Solution supports data transfers from the 3897 to remote printers at 900K bit/sec or about 50 to 60 pages per minute. A data compression feature can increase that performance to 100 pages per minute at 400K bit/sec.

"Using data compression, we can bring better performance and reduced bandwidth charges to banking customers," Rohrbach said.

The Computerm Channel Extension System with frame relay support is available for prices ranging from $35,000 to $50,000 depending on the amount of bandwidth needed. The Remote Image Solution starts at $195,000 and will be available in the first quarter of 1994.

✆Computerm: (412) 391-7804.

Racal

Continued from page 11

ing and correlation, as well as net status, monitoring and problem determination capabilities.

"Our users will also be able to use the OpenView discovery system — which monitors topology changes and learns the network — that we feel is superior to our discovery system," Nowell said. "And HP users will be able to monitor systems they couldn't in the past."

Racal-Datacom management products could send data to OpenView in the past via an RMS Systems Gateway, but the combined application running on the OpenView platform will be faster and easier for users to employ, Nowell said.

Other Racal-Datacom management products, such as the CMS 400, which manages Racal-Datacom high-speed modems and multiplexers, are expected to move to the OpenView platform eventually, Nowell said.

Racal-Datacom is also considering building similar applications with IBM for use on its NetView/6000 SNMP manager.

"We are looking into that possibility later this year, but nothing has been confirmed yet," Nowell said.

The integrated Racal/HP software will be ready by the end of the year and will sell for approximately $15,000.

✆Racal-Datacom: (305) 846-1601.

SynOptics smoothly inte
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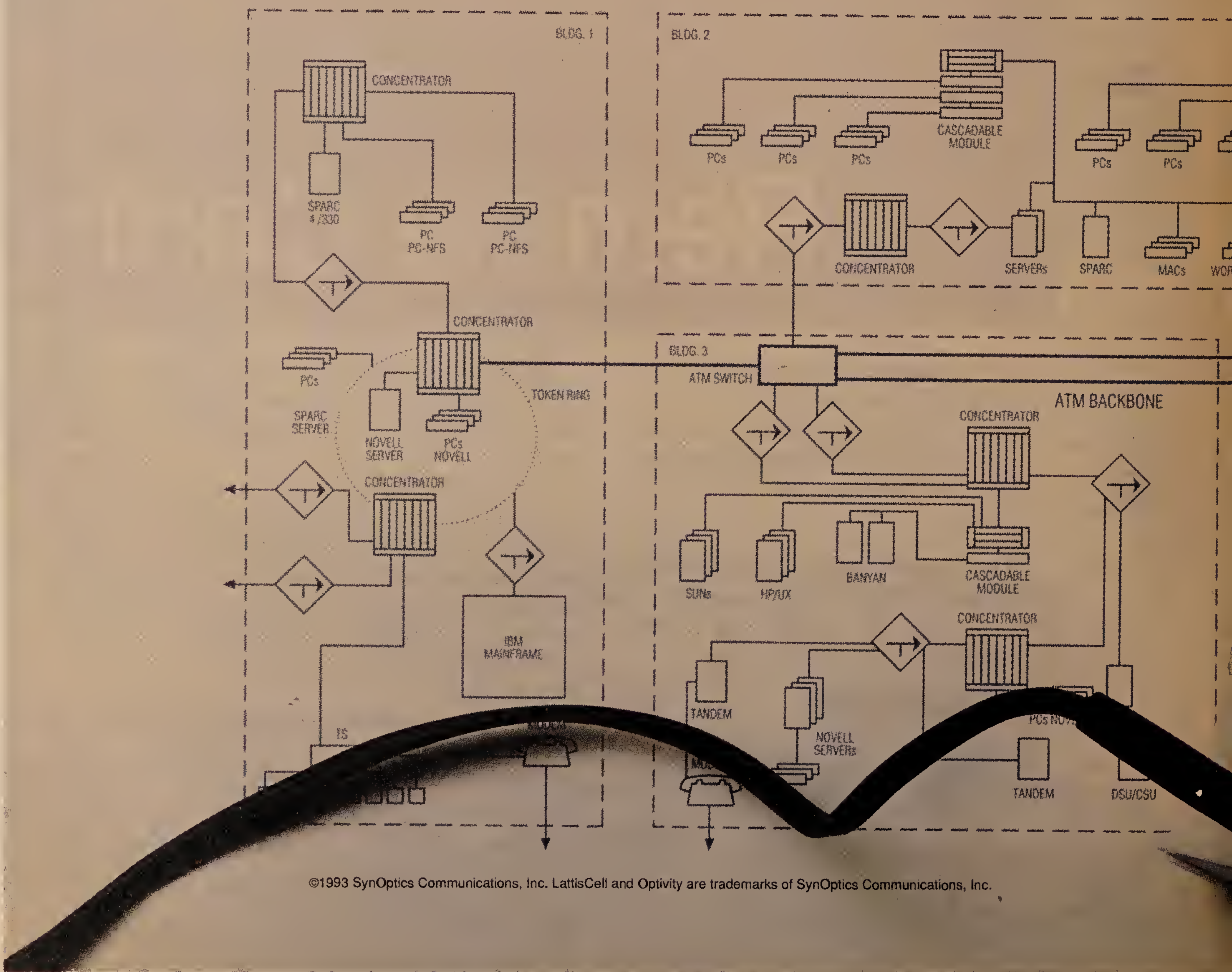
An enterprise network is one of your business' strategic assets. And with the constant arrival of new network technologies, you need a partner to help you merge and manage both the old and the new. That partner is SynOptics.

SynOptics' new LattisCell™ product family enables you to build a complete ATM network, from corporate backbones to desktop connections.

Since the beginning of the intelligent hub revolution, SynOptics has smoothed the transition to new network technologies—from network management, to the first multi-protocol hubs integrating Ethernet, Token Ring and FDDI topologies.

Now SynOptics takes you one step further, with the creation of a cohesive network fabric—an underlying structure that connects and manages individual technologies through the intelligent hub. It provides high-speed network communications. And it's flexible enough to grow as your network does, without sacrificing your existing investment.

When you demand new Asynchronous Transfer Mode (ATM) technology, SynOptics has it. LattisCell,™ our second-generation ATM solution, greatly increases performance both on the backbone and on the



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Cisco

Continued from page 11

groups of routers – such as all access routers – to which common configuration changes or software updates can be applied. The common changes or updates are then sent from a central location directly into the routers' flash memory. Previously, routine tasks such as password enablement were handled manually and one at a time.

The application will be available in the CiscoWorks 2.0 software version by the first quarter of next year. Version 2.0 costs $9,995, and upgrades from CiscoWorks 1.0 are $4,000 or free to customers enrolled in Cisco's software maintenance program.

UPGRADES TO EXISTING GEAR

Aiming squarely at the remote access routing market, Cisco announced two new models of its 3000 family and upgrades to its 4000 router and 500-CS product, as well as the addition of the new Cisco 2000 family (*NW*, June 21, page 1).

The two new 2000 routers are two-port devices that support Ethernet or token ring on the local side, and wide-area lines at speeds up to T-1.

The new Cisco 3000 series models are both four-port routers aimed at larger branch sites. The Model 3104 supports one Ethernet, dual serial and a basic rate ISDN interface, and costs $5,795. Model 3204 supports one token ring, dual serial and basic rate ISDN, and costs $6,995.

The prices of the four existing 3000 routers have been dropped by $1,500 each.

Cisco announced a dual-port Ethernet module for its 4000 router.

The module costs $3,600 and will be available in the third quarter of this year.

Cisco will be phasing out its IGS, a low-end router that many analysts say lacks the plug-and-play capabilities necessary for wide-scale branch site deployment, such as simple configuration parameters or flash erasable programmable read-only memory capabilities for remote software downloads. With a price tag between $4,000 and $5,000, most say it is also too expensive for use at numerous remote sites.

Cisco also announced enhancements to its 500-CS communication server that will enable remote sites and telecommuters to better access a corporate internet via dial-up links. The 500-CS supports as many as 16 asynchronous ports for local- or wide-area links of up to 38.4K bit/sec, and a single synchronous serial interface at up to T-1 speeds. It now comes equipped with dial-on-demand and bandwidth-on-demand routing. Dial on demand lets users employ dial-up facilities as their primary wide-area link, while bandwidth on demand lets the router use dial-up lines to handle overflow traffic on private lines.

In addition, the 500-CS will now support Novell, Inc.'s Internetwork Packet Exchange (IPX) traffic. Previously, it supported Transmission Control Protocol/Internet Protocol-based packets only.

Cisco's remote access router family

Router family	Office type	Maximum ports	Protocol set
Cisco 4000	Regional	6	All protocols
Cisco 3000	Large branch	4	All protocols
Cisco 2000	Small sites	2	TCP/IP, IPX, AppleTalk, bridging, X.25, frame relay
Cisco 500-CS	Small sites/ individual users	17 (16 asynchronous)	TCP/IP, IPX

SOURCE: CISCO SYSTEMS, INC., MENLO PARK, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

The units will be available by year end and cost $3,295 for the 8-port version and $3,995 for the 16-port version. There is no charge for the upgrade.

☎Cisco: (415) 326-1941.

BRIEFS

Continued from page 11

deo, and VideoSpigot capture up to 30 frame/sec of full-motion video from video cassette recorders, cameras and laser discs. Data is converted into Audio Video Interleaved files that can then be edited using Microsoft Corp.'s Video for Windows.

The VideoSpigot costs $500.

Creative Labs: (408) 428-6600.

Merrin Financial, Inc. has announced that 12 major Wall Street brokerage firms will use its Intermarket Trading Network (ITN) to obtain a completely electronic trading network.

ITN links money managers, brokers and exchanges to a single internet that lets users execute more trades in less time, obtain more accurate information and eliminate paperwork.

Merrin: (212) 563-3700.

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ng network.

desktop. Plus, our complete family of LattisCell products is integrated into a powerful silicon chip set, offering you a significant cost advantage.

SynOptics integrates hardware and software, delivering unparalleled capabilities to manage your network as a single-system solution. Optivity™ network management software gives you the visibility to control connectivity, bridging and routing functions from a single management station, or diagnose problems that may encompass more than one element of the network. Working with SynOptics' ATM solutions, Optivity helps you manage, monitor and diagnose problems across the entire network fabric.

So if you're building or managing an enterprise network, get the wrinkles out with our integrated solutions. Call 1-800-PRO-NTWK for our Solutions Kit on ATM, including our just-released white paper "The Roadmap to ATM Networking." Because at SynOptics, we're smoothing the way for the network of the future.

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Circle Reader Service #2

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Circle Reader Service #14

LAN WORLD

A Special Monthly Section for LAN Decision Makers

Configuration made easy

BY SKIP MACASKILL

The network manager picked up her telephone and listened to a user gripe about not being able to access the server from his new office. Apparently, a technician botched a connection in the wiring closet.

She went to call the technician but realized he was out doing another move — the fourth one this week, and it was only Wednesday.

The above scenario is all too familiar to net managers whose staffs are stretched thin doing these routine but time-consuming moves, adds and changes.

While most local-area network hub vendors have been concentrating on adding bells, whistles and colorful icons to their management offerings, some have heard users' cries for help and are rolling out configuration tools that ease the burden of these tasks.

The tools include per-port configuration switching that eases the job of reconfiguring a hub, per-port networking that allows each port to be one end of a point-to-point connection and virtual LAN capabilities that allow any port to participate in any logical work group.

There has been a lot of vendor activity on the per-port configuration switching front.

There has been a lot of vendor activity on the per-port configuration switching front. This month, for example, LANNET Data Communications, Inc. and Xyplex, Inc. added the feature to Ethernet environments, joining a select group of vendors that already offer it.

Chipcom Corp. pioneered the technology in 1991 for Ethernet environments, while Bytex Corp. and Optical Data Systems, Inc. offer similar features on the token-ring side.

There are also vendors that can provide configuration switching on a per-module or segmented-module basis, including NetWorth, Inc. and SynOptics Communications, Inc.

See **Moving**, *page L7*

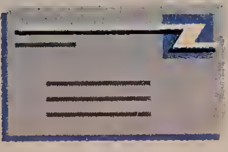
NetWare Global MHS is enterprise-ready

Recent release of NetWare Global MHS good news for users: It works, is flexible, cost-effective.

BY MARK GIBBS

> *"The root cause of change in the '90s will be globalization. You'll have to have global standards for quality, for pricing, for service, for design. You will have to have global leadership."*
>
> Noel Tichy
> Professor of organizational behavior
> University of Michigan

Novell, Inc. is apparently angling for just that — globalization. The release last month of NetWare 4.0 with its rich new directory service will help customers build larger, more manageable nets.



But 4.0 is not the company's first foray into the realm of enterprise local-area network services. Nine months ago, it shipped NetWare Global Message Handling Service (MHS), the server-based version of its NetWare MHS offering.

NetWare Global MHS is not just NetWare MHS in a new guise. The added features and functions make the system far more suitable for enterprise networks and give it the ability to become a high-powered, low-cost multistandard message switch.

If you are trying to decide whether to move to NetWare Global MHS from NetWare MHS, or if you are using some other messaging platform and the MHS products look interesting, there's good news and there's better news.

The good news is NetWare Global MHS works. It is robust, flexible, powerful, can act as a mail router for other electronic mail sysems and is a cost-effective solution. The better news is that it adds significant functionality to NetWare MHS, is backward-compatible and is getting support from the market.

Is there a significant downside to NetWare Global MHS? Many industry commentators have said it is resource-hungry, as if systems software shouldn't use any resources. But just about everything you add to your net demands substantial resources. And the payback from NetWare Global MHS is better than many other system products, so the cost of the extra resources should be kept in perspective.

But there is a problem with the management interface to NetWare Global MHS. While Novell hoped that it would do better than other vendors in this area, it has not.

It isn't that the interface is impossible to use, it is just weak and a little confusing. There is also a problem with con-

See **Novell**, *page L4*

HP hub boasts security, mgmt.

BY SKIP MACASKILL

Palo Alto, Calif.

Hewlett-Packard Co. this week will bolster its LAN offerings when it unveils a new work group hub with security features and two management applications that ease control of stand-alone and interconnected work groups.

The new EtherTwist Hub Plus/24 S is a 24-port, 10Base-T Ethernet hub that is geared to security-sensitive businesses that need to protect their local-area networks down to the work group level.

Based on Intel Corp.'s i960 Reduced Instruction Set Computing processor, the Plus/24 features built-in intruder protection in the form of automatic port disabling that restricts network access to approved users by assigning an authorized station address to each of the hub's 24 shielded or unshielded twisted-pair ports.

If an unauthorized device or user is detected, the Plus/24 automatically disables the intruding port and sends an alarm to the management console sitting on the net or at the corporate LAN running a Simple Network Management Protocol-based net management system.

The hub's eavesdrop-prevention capability will permit only the destination address to receive traffic while scrambling that data to the remaining ports on the hub.

Net managers may set station addresses and eavesdrop-prevention features on a port-by-port basis. They may also assign a password to the hub to prevent anyone else from changing the device's configuration. Security features can be set via an RS-232 port or HP's OpenView Windows or Unix net management software.

In addition to the RS-232 port, the Plus/24 provides a BNC port for thin coaxial cable connections and an

See **HP security**, *page L14*

BRIEFS

Madge N.V. last week filed a registration statement for its initial public offering of over six million shares of common stock at a price between $10 and $12 per share. Of those shares, 3.5 million are being offered by the company and the remainder from certain stockholders. Following the offering, 27.4 million shares will be outstanding. The expected public offering should become effective in August, with net proceeds earmarked for "general corporate purposes."

A copy of the prospectus can be obtained by calling Hambrecht & Quist, Inc. at (212) 207-1400.

Separately, Madge said it had settled its pending patent litigation with Willemijn Holding BV, which is the owner of U.S. Reissue Patent 31,852 for token-ring data transmission systems. Willemijn Holdings had been suing Madge for infringement of that patent. Terms of the settlement were not disclosed.

Racal InterLan, Inc. last week rolled out its next-generation InterLan EtherBlaster network interface card line with a new single-chip architecture. The EtherBlaster, compatible with 16-bit Industry Standard Architecture (ISA) personal computers or 32-bit Extended ISA personal computers, is available in two versions. The EtherBlaster TP offers an attachment unit interface connection for thick-net Ethernet links as well as an RJ-45 port for 10Base-T Ethernet connectivity. The EtherBlaster T2, which also has the RJ-45 port, has a BNC connector for thin-net Ethernet connectivity. The TP costs $159, while the T2's price has not been set. Both are available now.

Racal InterLan: (800) 526-8255.

Cabletron Systems, Inc. last week reported record financials for its first quarter ended May 31. Net sales were $131.5 million, up 49% over the same period last year, and net income was $26.2 million, up from $17.6 million in the same quarter last year.

Trend Micro Devices, Inc. last week released the latest version of its StationLock workstation security software. Version 1.6 offers Audit Trail, which allows managers to track access attempts; ScreenLock, which causes the screen to go blank at specified times or after a preset period to protect data on unattended personal computers; Non-Privilege User Access Right, which allows the manager to control access to the StationLock setup program; and Virus Clean Option, which detects and eliminates viruses.

Version 1.6 is now available and costs $129.

Trend Micro Devices: (310) 782-8190.

Reviewing the ins and outs of RAID

BY CARYN GILLOOLY

It's become cliche: As more mission-critical applications are moved down to local-area network platforms, fault tolerance becomes increasingly important.

But despite the lip service, there are few LAN products out there that deliver.

High-end fault-tolerant products that can keep a LAN running 24 hours a day, seven days a week are just beginning to emerge. And most of these are prohibitively expensive, appealing only to the highest end users.

Enter RAID: Redundant Array of Inexpensive Disks. RAID is a server disk storage option that does not ensure uptime but does help ensure data integrity. The network may go down, a disk may even crash, but the data will remain intact and accessible.

With RAID, data is spread over an array of cheap disks, eliminating the need for — and single-point-of-failure danger of — one large expensive disk.

By itself, an ordinary disk array generally does not provide any data protection when one disk fails. But with software provided by companies such as Chantal Systems, Inc., Legacy Storage Systems, Inc., Micropolis Corp., Sayno Icon and Storage Dimensions, Inc., disk arrays can be set up to provide differing degrees of fault tolerance.

Most of these companies provide products that offer RAID Level 0 through RAID Level 5, with Level 0 providing the least protection and Level 5 the most.

RAID Level 0 is somewhat of a misnomer. Although the RAID prefix would seem to ensure some level of data integrity, it doesn't. RAID 0 simply specifies disk striping, or writing data across multiple disks (see Figure 1, this page).

This means data is lost if one of the disks within the array fails. It does, however, provide some level of fault tolerance by making it possible to save some data on the array even when a disk fails.

While marginally fault tolerant, RAID 0 provides a significant performance advantage — as much as 400% — over storing data on a single drive. Because there are several disks working together, several or all disks can be written to at once to complete a single job. Writes and reads can also be done simultaneously because the processor can access different disks to gather the information.

In addition, because capacity is not set aside for redundancy, RAID 0 storage capacity is the same as the total capacity of the drives in the array. With higher level RAID devices, some storage space is allocated for redundancy.

With these characteristics, RAID 0 is good for users that need exceptionally high performance levels but can also tolerate occasional data loss. The higher the RAID level, the heavier the performance hit.

ADDING FAULT TOLERANCE

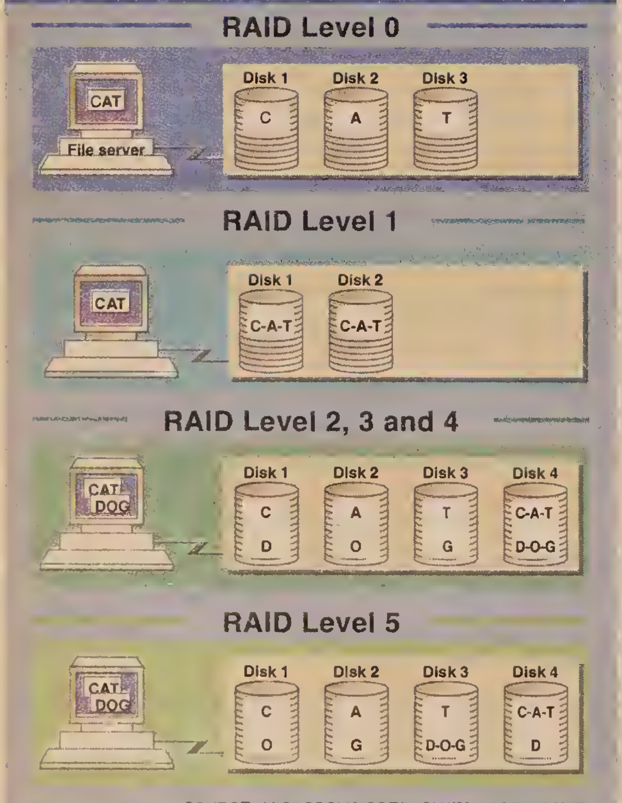
RAID Level 1 provides 100% data redundancy through the use of disk mirroring. When data is written to one disk, it is also written to another disk within the array.

There are both advantages and disadvantages to RAID 1. First, if one drive fails, the system can continue operating off the intact drive. RAID 1 also provides some of the performance advantages of RAID 0 on read requests since the requests can be distributed among the redundant drives.

Unfortunately, because all information must be entered in its entirety on each disk — rather than splitting up one write job among several disks — the user will have to learn to accept a major performance hit on writes to the drive.

Spanning the RAID spectrum

Figure 1



SOURCE: MICROPOLIS CORP., CHATSWORTH, CALIF.
GRAPHIC BY TERRI MITCHELL

With RAID 1, the processor must wait for the write to finish on one disk before it starts the write to another because all data is being entered onto each disk.

This contrasts RAID 0, where the processor can still only handle one job at a time but can split that job among several disks, speeding up the process.

In addition, RAID 1 systems can be twice as expensive as RAID 0 systems: Mirroring requires twice as many disks. And if more storage space is needed, drives must be added in increments of two.

RAID Levels 2, 3 and 4 all provide data striping across multiple disks — as in RAID 0 — but also specify additional disks for fault-tolerant purposes.

RAID 2 specifies striping at the bit level. This means the first bit of data in a stream is sent to the first disk, the second to a second disk and so on.

It also specifies multiple disks to store memory recovery data. This means that each striped disk in the array must also be mirrored. Because of the performance and cost overheads involved with RAID 2, it is "not economical or practical for personal computer systems," according to documents issued by Storage Dimensions, one of the leading providers of RAID products.

RAID 3 and 4 are more practical approaches to fault tolerance in LAN environments. Like RAID 2, Levels 3 and 4 specify data striping. RAID 3 strips data by bits, while RAID 4 strips data in larger blocks. Unlike RAID 2, RAID Levels 3 and 4 specify a single drive dedicated for fault tolerance.

This means that, as in RAID 0, data is striped across multiple disks, but there is one drive that is dedicated to retaining a copy of all the data on the system.

The advantages of RAID 3 and 4 are primarily their cost and storage capacity. Because the user only has to specify one additional disk to back up all the information within the array, the cost of RAID 3 and 4 implementations is only the price of one disk more than the cost of RAID 0.

However, while RAID 3 and 4 are faster than a standard single disk drive, their performance is fairly poor comparatively since all disks are used with every read and write. And write performance can be even worse since every write to the array has to go to the additional backup disk, which can consequently be the source of a system bottleneck.

Although RAID 4 is slightly more efficient than RAID 3 because of the larger blocks of information, the differences between the two are virtually negligible.

RAID Level 5 is fast becoming the most implemented of all the RAID levels. RAID 5 specifies that data be striped across all disks — as in RAID Levels 0, 2, 3 and 4 — but also that backup information be distributed evenly across all disks.

This combination has several implications. First, it provides a high level of fault tolerance. If one of the drives fails, the information can be reconstructed from the mirrored portions of each remaining drive.

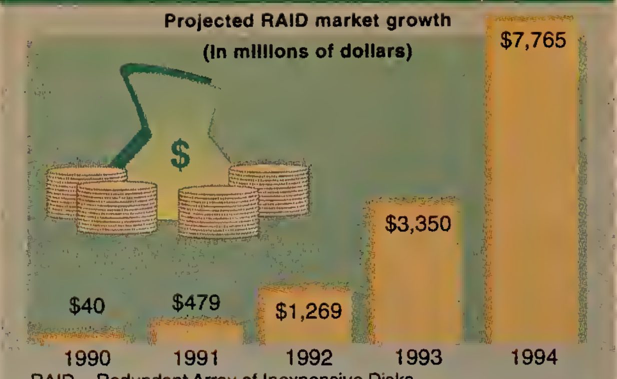
Level 5 performance is also better than that of RAID 3 or 4. For starters, there is no single backup drive to act as a system bottleneck; therefore, the system can process multiple write requests at the same time. In addition, each disk can operate independently and can, therefore, satisfy simultaneous read requests.

RAID 5 also has a relatively low cost of redundancy since users need only segment a small portion of each disk for duplicate information.

So if you're thinking of investing in a RAID system, make sure to match your application with the RAID level that best meets your needs. ◼

The growing face of RAID

Figure 2



RAID = Redundant Array of Inexpensive Disks

SOURCE: MONTGOMERY SECURITIES, SAN FRANCISCO
GRAPHIC BY TERRI MITCHELL

Storage system gets net mgmt.

BY CARYN GILLOOLY

Milpitas, Calif.

Storage Dimensions last week introduced LANStor Plus, an enhanced version of its existing LANStor storage subsystem for Novell, Inc. NetWare-based nets that boasts advanced network management features.

LANStor Plus is a "complete rewrite, from the ground up," of the original product, said Greg Brashier, director of the LANStor business unit of Storage Dimensions, based here.

According to Brashier, a common problem that NetWare administrators have today is locating storage subsystem failures. Often, the system will only alert the administrator that a failure has occurred and will not help identify what the failure was or how it happened.

LANStor Plus provides that capability by monitoring Small Computer System Interface sense codes — the information generated from component-level failures. The system will then automatically translate those codes into plain-English error messages, directing the administrator to the source of a failure.

The firm also unveiled last week LANStor DiskAlert, an error notification package that lets the administrator dictate who receives error messages.

With DiskAlert, the administrator can define which types of messages get sent to specific people or even that all error messages are broadcast over the network. The software can also send information through a modem to get failure messages to an administrator through a paging device.

The LANStor Plus driver and LANStor DiskAlert software are available now with all LANStor Continua Redundant Array of Inexpensive Disks (RAID) 5 and LANStor ReFlex modular external storage systems. An 8.4G-byte LANStor Continua costs less than $30,000, while a 10.5G-byte LANStor ReFlex costs less than $23,000. Customers with existing LANStor Continua and ReFlex systems will receive free upgrades. ◼

Sun tries hand at consulting

BY FREDRIC PAUL

Chelmsford, Mass.

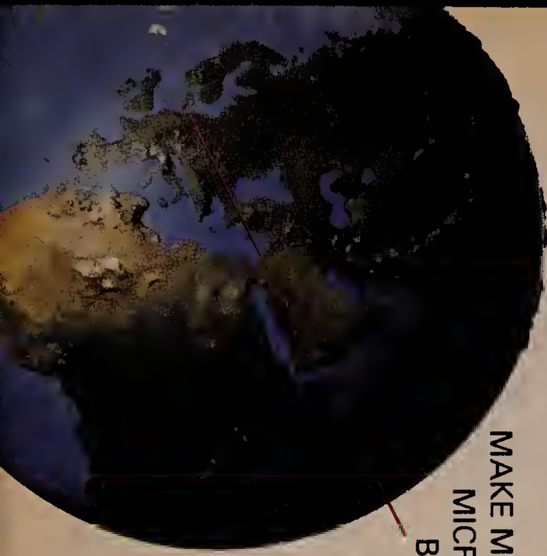
Sun Microsystems, Inc. last week announced the formation of SunNetworks, a new consulting business designed to help customers integrate Sun products into heterogeneous enterprise networks.

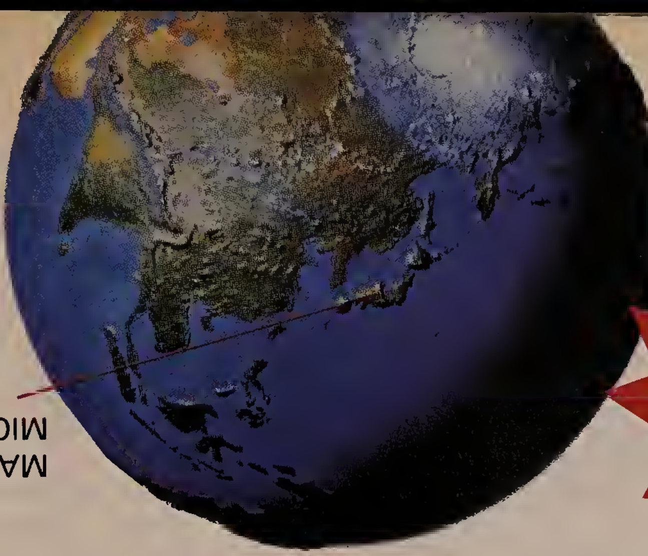
According to Mark Freund, director of the start-up unit, "We are creating technology SWAT teams" of three to five engineers to help customers design, implement and manage corporate networks. These teams will concentrate on high-speed networking such as Asynchronous Transfer Mode (ATM), multiprotocol networking environments mixing Transmission Control Protocol/Internet Protocol with other protocols, and establishing and using network management procedures.

Unlike many traditional consultancies, SunNetworks "is selling deliverables, not people," Freund said. "We will charge per job," he said, and only occasionally for time.

SunNetworks' deliverables will include things like creating network blueprints for new ATM installations and performing network audits, technology assessments and validations. The unit hopes to help customers move to new technologies such as multimedia, mobile computing and multiprocessing servers, and also hold interactive workshops for customer training

See **Sun**, *page L11*

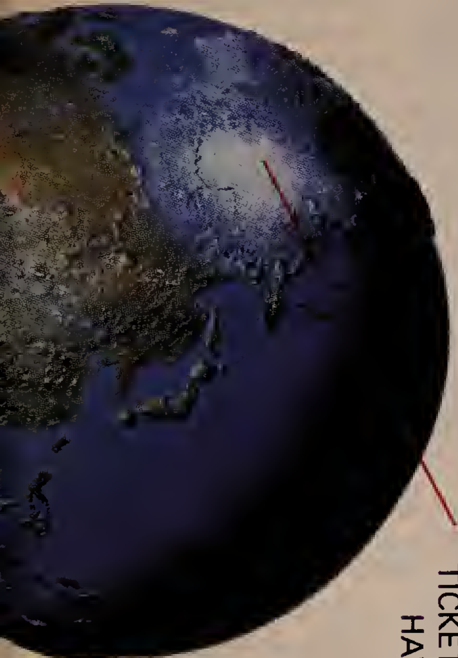


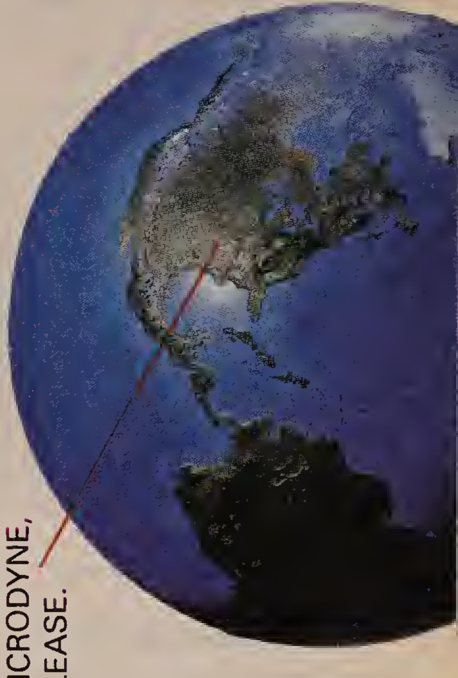


New Lower Prices

REMOTE COMMUNICATIONS

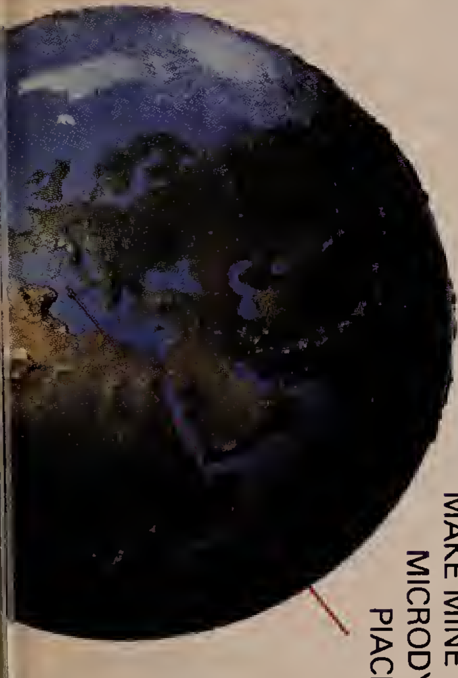
For greater value, guess who runs circles around the competition.

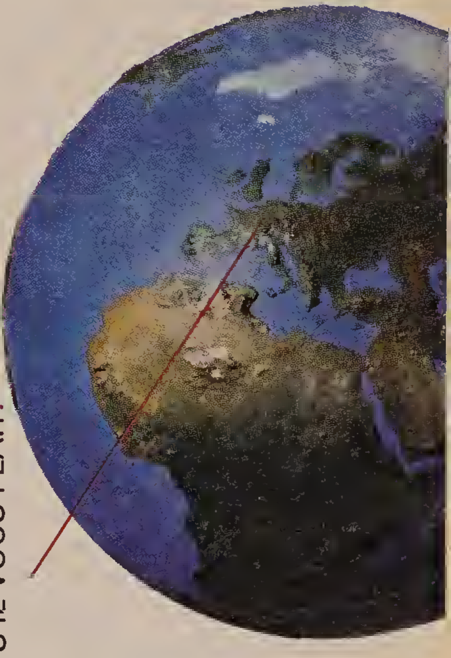




All around the world people are talking about Microdyne's NetWare Access Server and NACS for dial-in/dial-out communications now available at an **exceptional new price**. No one can provide you with greater value in a high performance remote communications platform, and it's co-developed with Novell for compatibility guaranteed. Giving your DOS and Apple users remote access to the NetWare LAN with complete NetWare security has never been easier. For more information on Microdyne's proven NetWare Access Server and NACS, and a copy of our product catalogue, call 1-800-255-3967, ext. 231, or 703-960-9661. Make yours Microdyne.

Microdyne





Circle Reader Service #7

Novell

Continued from page L1

figuration. Novell has added considerable functionality to NetWare Global MHS but failed to clearly explain the architecture.

The final shortfall is complexity. As with all products that survive the rigors of the marketplace, it has evolved to include new or enhanced functionality. The cost of this evolution for NetWare Global MHS is complexity in installation, configuration and management.

DISTINGUISHING FEATURES

The difference between NetWare Global MHS and other LAN messaging systems is that, like NetWare MHS, it is purely a back-end transport mechanism for electronic messaging: It has no front-end interface.

Being back-end transports, NetWare Global MHS and NetWare MHS offer a broad foundation for messaging. It is easy for any application to be message-enabled and to communicate with any other message-capable application, regardless of whether that application is on a NetWare MHS- or NetWare Global MHS-based system.

There is an extensive catalog of applications — both E-mail applications and mail-enabled software such as calendaring systems — that are NetWare MHS-compliant and therefore NetWare Global MHS-compliant. There are more interoperable applications for NetWare MHS than there are for any other LAN messaging transport.

NetWare Global MHSdiffers from other messaging systems in how it is tied to the NetWare file server system. NetWare Global MHS consists of a number of NetWare Loadable Modules (NLM), processes that operate inside the NetWare environment.

Before you can understand NetWare Global MHS, you need to have a good grasp of the history and technology of NetWare MHS.

Novell's NetWare MHS is a product with a long and complex history. It started in the mid-1980s as the embedded messaging back end of the Coordinator, a groupware product from Action Technologies, Inc.

The back end was ultimately spun off as a separate module called the Message Handling System and was acquired lock, stock and source code by Novell in 1990. The front end — the groupware part — is now the Coordinator marketed by Da Vinci Systems Corp. of Raleigh, N.C.

When Novell took over MHS, a new enthusiasm for the product was generated. Placing it in a newly formed division, the NetWare Messaging Products Group, and renaming it NetWare MHS confirmed that Novell was at last getting serious about messaging.

The biggest boost NetWare MHS received was the formation of the MHS Alliance, a consortium of vendors that use MHS in their products. The group's objective is to promote MHS as a standard and establish interoperability testing and validation. With currently 35 members, the alliance will probably do more to establish NetWare MHS as a major de facto standard than Novell has been able to do so far.

The basic concept behind NetWare MHS is fairly simple. It uses a file-based application program interface (API) that provides an interface between the messaging system and applications. Applications sending messages would put their data into files in a standard format and then place the files in specific directories. The NetWare MHS programs deliver the messages to both local and intersystem addresses.

For example, the /MHS/MAIL/SND directory is where an application places messages, each in its own file, to be sent to another address. The actual routing and transfer of messages is handled by a "postman" service referred to as a Message Transfer Agent.

This is a DOS-based program that runs on a network workstation. If transferring between remote sites is required, the workstation must have modem connections available.

When an application wants to see if there are messages waiting, it checks the subdirectory for the user name and the subdirectory under that for the target application to which the message is addressed. For example, if a user, say "mgibbs," is using BeyondMail, the correct directory to look in for mail would be /MHS/MAIL/USERS/MGIBBS/BMAIL (BMAIL is the identifier used by BeyondMail).

NetWare MHS's concept is fairly simple. It uses a file-based API that provides an interface between the messaging system and application.

NetWare MHS is riddled with terms from the Open Systems Interconnetion X.400 standard.

MHS is an X.400 term that stands for Message Handling System, but NetWare MHS is not X.400-compliant. Novell also refers to the postman component as the Message Transfer Agent, but it is not an X.400 Message Transfer Agent.

The postman function under NetWare MHS, Connectivity Manager, can be configured to call remote MHS systems on a scheduled basis. It is part of a DOS application that also allows the net manager to configure modem connections, define users and other MHS hosts, and manage message queues.

When message exchange with "alien" systems is required, MHS can be set to run gateway processes. These gateways are just DOS programs that connect to the alien service, send mail that has been queued for export by the postman and receive mail. The incoming mail is then placed in a queue for the postman to route to the required user.

ENTER NETWARE GLOBAL MHS

NetWare Global MHS is related to MHS in its support of the same APIs, support of a superset of the messaging format and interoperability at the transport level.

It differs in the connectivity options it offers for the LAN environment and in the fact that it is implemented as an NLM suite. The latter is important because it removes the need for a workstation on the network to run the postman components but increases the number of failure points in the file server environment. That is not to suggest that NetWare Global MHS is unstable or unreliable. The basic requirements for installing NetWare Global MHS are a minimum of 11M bytes of random-access memory, 8M bytes of disk space and whatever serial ports or internal modem cards are needed for external connections.

NetWare Global MHS can be installed as a new system or used to upgrade an existing NetWare MHS environment. If the installation is an upgrade, you can migrate existing accounts and configuration data for remote MHS host systems and gateways to the new system. Installation is not time-consuming but convoluted.

The superset of the messaging format that NetWare Global MHS uses is a Novell specification called Standard Message Format (SMF) 71. This extends the previous SMF 70 in many ways, including allowing extended addresses.

In SMF 70, user names were limited to eight characters, but with SMF 71,full full names can be used.

Another addressing extension is the support for hierarchical addresses. Prior to Version 71, an E-mail address would have consisted of a foreshortened name tied to a location with an sign — for example, "mgibbs-gyre." SMF 71 allows a root work group — for example, the company name — and any number of sub-work groups. The only restriction is that the total length of an address must not exceed 253 characters.

There are some rather curious restrictions on address formats, however. Names containing more than 64 characters without a space are illegal. While this is not likely to affect many people, it is one of those technical support problems that will cause nightmares for some.

The ability to specify hierarchical work group names should be mandatory for messaging systems intended to support large companies. They allow the structure of a company to be reflected in addresses. A root work group is defined for each NetWare Global MHS server, and all servers that use that name belong to the same work group.

If you are upgrading to NetWare Global MHS, all addresses will be translated when NetWare MHS systems using SMF 70 (or even the older SMF 64) are linked. In fact, all aspects of previous SMF versions are translated by NetWare Global MHS systems so no data is lost.

Since this increases the complexity of the directory of user names, directory synchronization has been implemented as a core service. Now NetWare Global MHS servers can be configured to exchange their directory information on schedule with one another and with NetWare MHS systems, although there are restrictions on how this operates for the latter.

If Simple Mail Transfer Protocol (SMTP) or Systems Network Architecture Distribution Services (SNADS) support is loaded, directory exchange can be carried out with those systems, as well. Directory exchange can also be done across serial links. Messaging pipelines are another new NetWare Global MHS feature. In NetWare MHS systems, servers communicate using direct connections between pairs of MHS servers.

Pipelines are a new facility that lets the user create common channels, rather like virtual circuits, between NetWare servers on a LAN. Pipelines are different from server-to-server links in that the latter must be set up and configured for each destination server. Servers on pipelines can find and communicate with any other server on the pipeline without preconfiguration. In enterprisewide networks, this makes system setup far simpler.

Other than the pipeline connections, NetWare Global MHS supports serial links to MHS servers. The range of supported modems is good, but problems may arise if you want to use a modem that is not listed.

As shipped, NetWare Global MHS also offers support for standard COM ports and a few intelligent asynchronous cards. Unless these intelligent cards are used, problems such as lost data and high error rates may crop up in connections faster than 2,400 baud.

Another feature is embedded document translation, which allows for third-party NLM-based document translators to automatically convert document formats before delivery.

One word processing user with WordPerfect, for example, could send documents to a Microsoft Word user without the recipient taking any action to make the document usable.

Today, the only available NLM third-party offering for document translation is KeyPak NLM from KeyWord Office Technologies, Inc. in Calgary, Alberta. The product supports conversions between Microsoft Word (for personal computers and Macintoshes), WordPerfect 5.X, Microsoft Rich Text and other formats.

KeyWord also offers document translation for other platforms such as MVS and VM, so its support for NetWare is pretty sophisticated.

To exchange messages with alien systems, Novell has released NLM-based protocol modules that support IBM's SNADS, SMTP and, most importantly, full-fledged X.400 support from Retix. These add significant expense to a NetWare Global MHS installation, but they are still much less expensive for messaging systems supporting a few thousand users.

To support currently used gateways, NetWare Global MHS comes with a support program called gwdaemon, which runs on a workstation. The program simply acts as a minimal subset of the old NetWare MHS connectivity manager that runs the gateway and handles the integration of the gateway messages with the NetWare Global MHS system.

Novell's NetWare Global MHS is a significant upgrade to NetWare MHS. It provides a whole range of services that are crucial for turning LAN-based electronic messaging into a communications strategy.

With the inclusion of support for standards such as SMTP, SNADS and X.400, and reputed scalability to large environments, NetWare Global MHS is designed for enterprisewide networking.

Once Novell completes the next version — which will integrate NetWare Global MHS with NetWare 4.0's NetWare Directory Services — it will be far easier to control messaging in a coordinated way with other NetWare network services.

☛ Gibbs is a writer and consultant based in Ventura, Calif. As a contributing editor for the Patricia Seybold Group, he is currently developing a report on Novell's MHS technology, due to be published in July. He can be contacted through CompuServe [75600,1002] or by calling (805) 647-2307. His latest book, *The Absolute Beginner's Guide to Networking,* (Sams Publishing) is now available.

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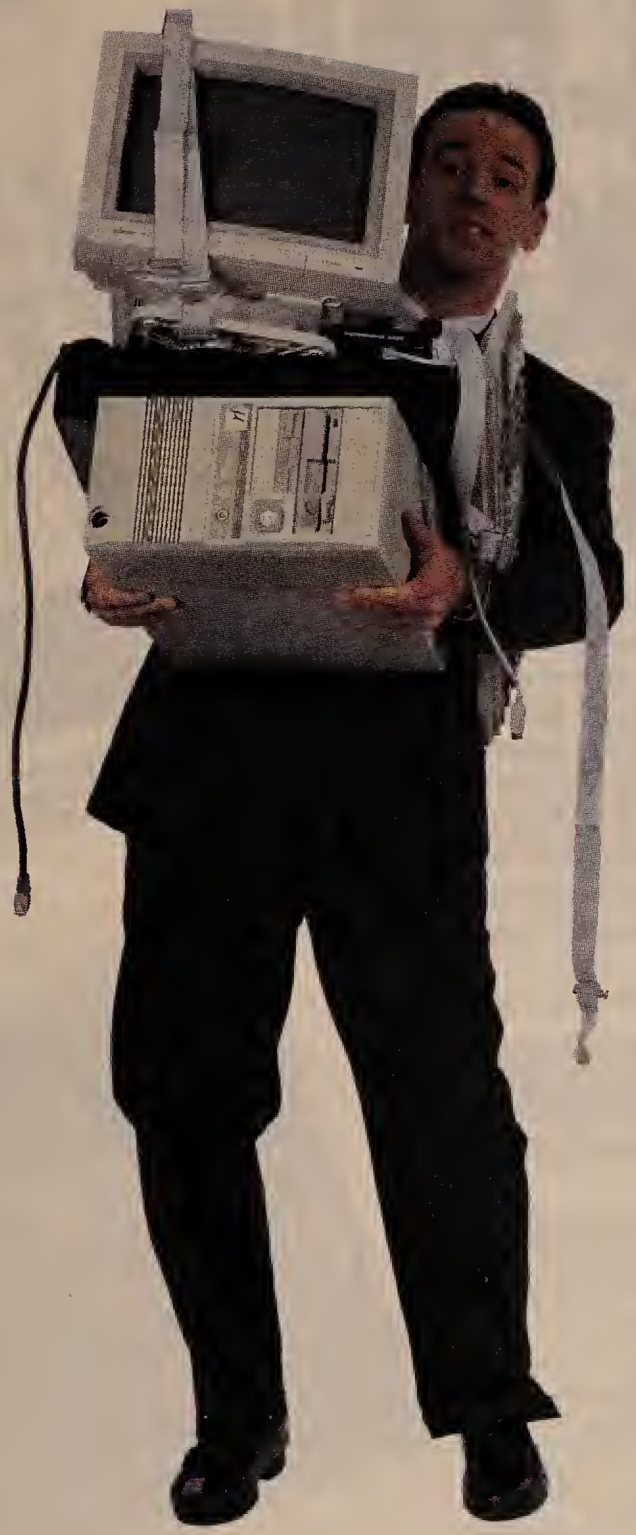

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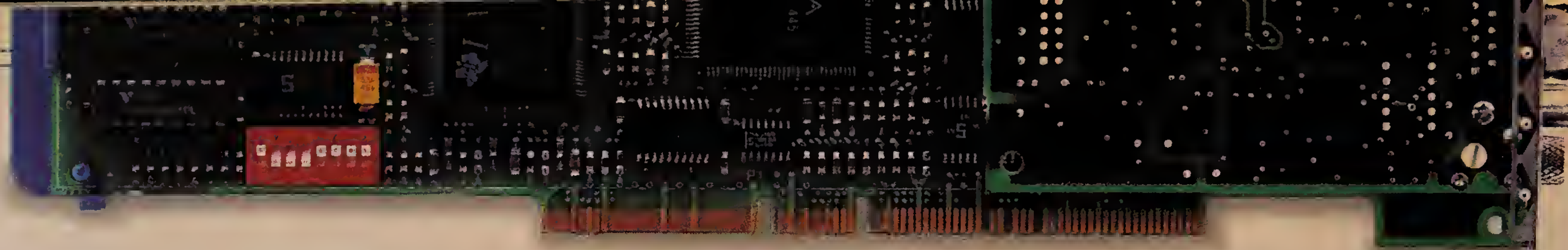

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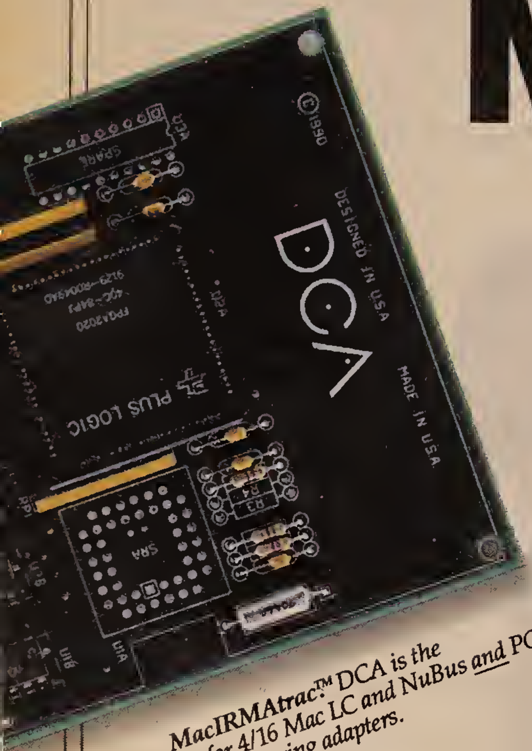

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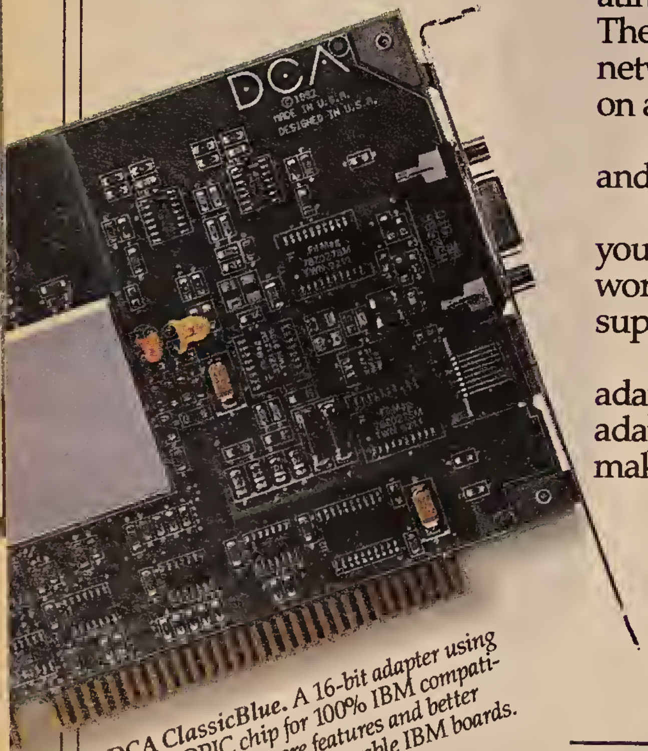

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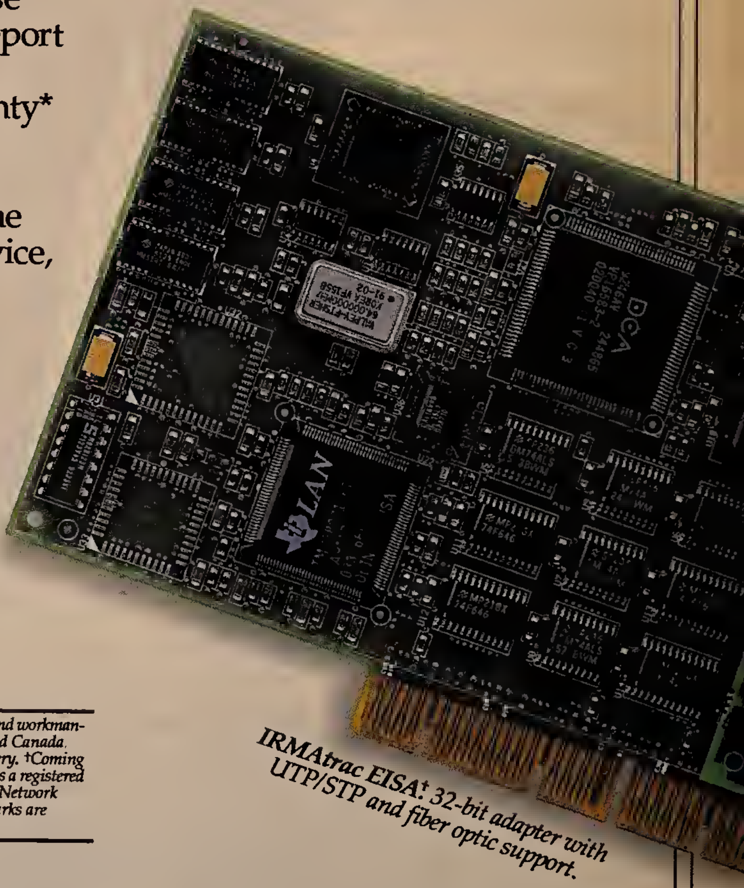

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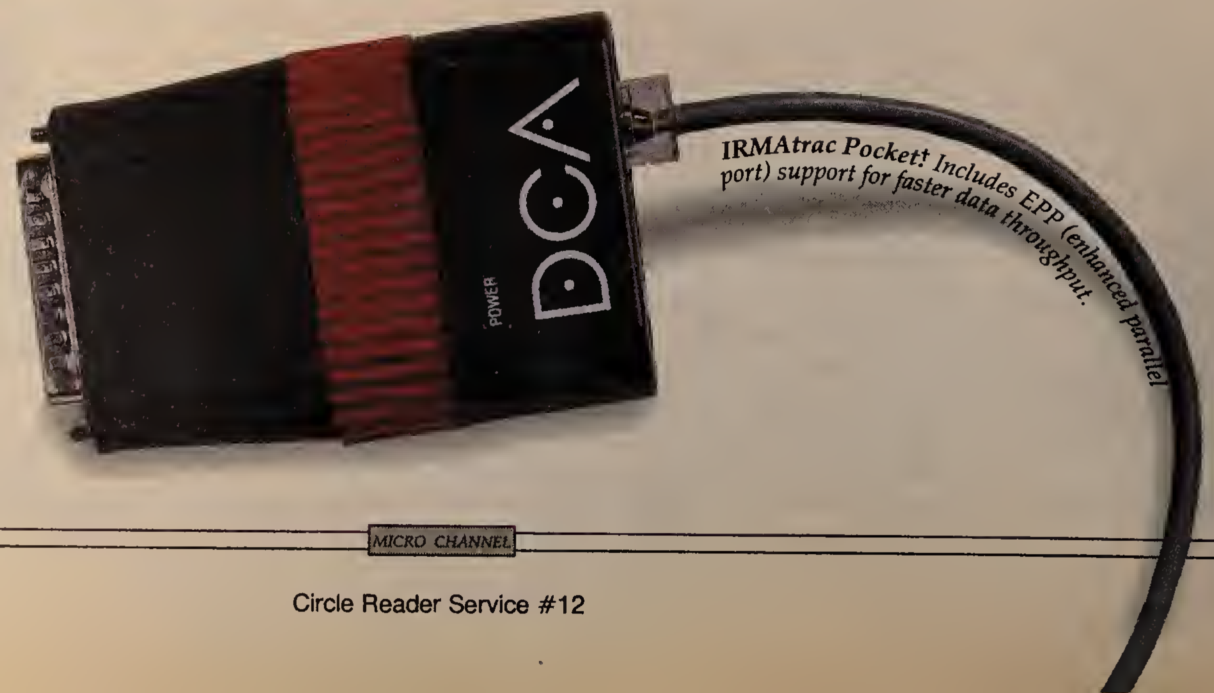

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Windows NT needs third-party support

Success depends on communication abilities.

BY FREDRIC PAUL

Redmond, Wash.

Bill Gates may be the richest man in the country, and Microsoft Corp. may be one of the most powerful companies in the computer industry, but that alone is not enough to ensure success for the new Windows NT network-capable operating system.

In today's multivendor world, the ultimate success of any operating system depends on its ability to communicate and work with existing systems as well as support from third-party companies — especially application developers.

Since users are more concerned with applications than operating systems, their long-term interest in Windows NT will be determined not by what the operating system does, but by what they can do with it.

Many observers contend that NT will find its first home as a network application server, supporting Novell, Inc.'s NetWare and other network operating systems (NOS). But for that to happen, there will have to be Windows NT applications for the operating system to service.

Microsoft will supply some of these applications, such as SQL Server for Windows NT, but the vendor cannot possibly come up with everything needed to help NT reach a critical mass.

Despite its well-deserved reputation for seeking total control of the markets it enters, Microsoft clearly realizes the importance of convincing the rest of the industry to hop on the NT bandwagon. At the product's official introduction last month in Atlanta, Gates seemed to spend more time crowing about industry support for NT than praising the operating system's features and functions.

"Windows NT is the first completely new computer operating system written in the last decade," said Gates at the Comdex/Windows World coming-out party, "but it's only one piece" of the puzzle. The company demonstrated 75 application development tools at the NT launch and claims to have shipped about 65,000 software development kits.

While NT will run on existing DOS and Windows applications, the company is aggressively courting applications expressly designed to take advantage of NT.

According to Paul Maritz, Microsoft's senior vice president of systems, company surveys show that there are approximately 3,000 Windows NT applications under development for release in the next 12 months.

Maritz said he expects 500 commercial applications to ship this year alone. In fact, Microsoft now says its key goal for Windows NT's first year is simply to stimulate development of new client/server applications.

See chart on page L8.

If that's true, NT has already achieved a large measure of success. Client/server database products are already on the way from database heavyweights such as Gupta Corp., Informix Software, Inc., Ingres, Oracle Corp. and others — all due to ship this year.

For a representative list of the database applications for Windows NT, see the chart on page L8.

Dozens of vendors are planning to introduce specialized niche market software, including everything from Great Plains Software, Inc.'s accounting programs to human resources management software from PeopleSoft, Inc.

Microsoft plans to deliver 32-bit NT versions of its own Windows applications when the next releases are delivered this fall. The company has also committed to delivering SQL Server and SNA Server products for NT soon after the operating system hits the streets.

Of course, most of the forthcoming NT applications will not be new to the market. The majority of them will simply be ported from other environments. Since that's the fastest way to develop a library of applications, Microsoft is doing everything it can to support developers that want to bring their applications to NT, especially from the OS/2 and Portable Operating System Interface platforms.

"It's as easy to port to NT as to any 'other' Unix platform," Gates claimed.

Since Windows NT enters a market already crowded with NOSes, helping NT applications work with other environments is a priority for Microsoft, a necessity for users and a business opportunity for third-party developers.

Not surprisingly, connectivity products are on the way from large and small suppliers alike, including Banyan Systems, Inc., Beame & Whiteside Software, Ltd., Digital Equipment Corp., Digital Communications Associations, Inc., Novell, Sun Microsystems, Inc.'s SunSelect unit and others.

On the hardware side, Gates said, 20 companies are developing symmetric multiprocessing servers for Windows NT, with capacities from two to 32 processors each.

More than two dozen hardware systems manufacturers have signed licenses to provide NT on their machines, while Microsoft has certified NT to run on more than 1,000 personal computer models (see graphic, this page).

While software vendors certify their own products for use with NT, Microsoft has developed a certification suite of tests to ensure hardware compliance, according to Maritz.

In addition, the vendor has published the Microsoft Win32 Products and Services Catalog for Windows NT, a 468-page listing of the more than 1,000 offerings to be developed for Windows NT.

The catalog lists everything from 26 kinds of NT development tools to productivity and vertical applications in dozens of categories, including networking. Server applications and systems management applications are also represented.

Comprehensive as it is, the Win32 Catalog is already becoming out of date as developers continue to announce new Windows NT products every week.

While a few developers may be loath to hang their fortunes on a still untried network-capable operating system such as Windows NT, many others are rapidly deciding that they cannot afford to ignore it.

Systems vendors committed to Windows NT

Company	Type
Acer America Corp.	486, Pentium and MIPS-based PCs
Advanced Logic Research, Inc.	486DX and Pentium PCs
AST Research, Inc.	Premmia PCs and Premium SE Server
Compaq Computer Corp.	Various configurations
Dell Computer Corp.	Various configurations
Deskstation Technology, Inc.	Evolution Series MIPS-based PCs
Digital Equipment Corp.	Alpha AXP and Intel-based PCs and servers
Gateway 2000	Various configurations
Hewlett-Packard Co.	Intel-based desktop PCs
IBM Personal Computer Co.	Entire family of server products
Intel Corp.	Pentium-based systems
Intergraph Corp.	Technical and graphics workstations
International Computers, Ltd.	PCs and servers
MIPS Technologies (a subsidiary of Silicon Graphics)	Various configurations
NCR Corp.	NCR System 3000 servers
NEC Technologies, Inc.	RISC-based systems
NeTpower	RISC-based clients and servers
Olivetti	PCs, LSX5000 servers and RISC workstations
Sequent Computer Systems, Inc.	WinServer SMP servers
Siemens Nixdorf Information Systems, Inc.	Various configurations
Silicon Graphics, Inc.	MIPS workstations
Texas Instruments, Inc. Peripheral Products Group	Intel 486-based notebook PCs
Unisys Corp.	PW^2 and Advantage Plus PCs
Wyse Technology Systems Division	SMP servers
Zenith Data Systems Corp.	Various configurations

Sensing a new market, hardware vendors are eager to offer systems that include Windows NT.

SOURCE: MICROSOFT CORP., REDMOND, WASH.

Moving

Continued from page L1

Configuration switching allows a net manager to logically move a user or bank of users from one LAN segment to another — provided the segments are supported by the same hub — without making a trip to the wiring closet or altering the structured wiring plant. Chipcom and LANNET can switch users among four Ethernet segments, while Bytex has the ability to allocate its token-ring users over 152 segments.

If a user on LAN Segment A, for example, is moved to an office tied to LAN Segment B through a different hub module, the manager can use a point-and-click application on the central management console to regroup the ports.

Some vendors have introduced management applications that automate these reconfiguration processes. Chipcom's PathFinder application, for example, will automatically find users after they have moved and group them accordingly.

"This is incredibly sophisticated technology to deploy, which also means it's expensive," said David Fowler, vice president of marketing at Chipcom. "It also requires a hub architecture to support it, which is a problem for some companies because the hub was originally designed to handle only one network per box."

According to analysts, however, users can expect a plethora of announcements regarding this functionality by year end.

"This ability is starting to show up on more and more users' wish lists, so you can expect vendors without this offering to get it into their product lines one way or another," said Charlie Robbins, director of communications research at Aberdeen Group, Inc., a consultancy in Boston.

While configuration switching can provide immediate relief from the pain of moves, adds and changes, it is limited to the physical boundary of how many segments a single hub can support. If a user moves to an office tied to a different hub, the feature does little good.

"Although configuration switching is a valuable management tool because it allows the net manager to reassign users to segments on the fly, it is still a manual process," Robbins said. "The technology is the first step toward a virtual LAN environment, where any port can belong to any number of LANs, regardless of location."

PER-PORT NETS

Switched Ethernet hubs also ease configuration management, although they were not developed with that function in mind. The hubs are designed to extend the life of Ethernet by making it possible to establish full 10M bit/sec links between any two ports.

The switching engine needed to establish the links can reside on each hub module or be centrally located on a high-speed backplane.

For example, the engine could receive a packet from Port A, read the header and set up a call to Port B, which could be on the same module, on a different module in the same hub or in another hub. While the conversation is active, the link provides 10M bit/sec of dedicated bandwidth.

"In a per-port networking environment, the network doesn't have to change in terms of moving users around because each port becomes its own net and traffic is swapped on an end-to-end basis," said Chipcom's Fowler. "Dedicated links are set up between two Ethernet nodes, traffic is switched on a per-packet basis, and the conversation has 10M bit/sec at its disposal."

Some hub vendors such as Alantec Corp., Artel Communications Corp., Kalpana, Inc. and Synernetics, Inc. have architected their respective devices around the technology, while others such as SynOptics and Ungermann-Bass, Inc. are adding the functionality

See Moving, *page L11*

Selected applications for Windows NT

Database applications

Company	Product	Description
APEX Business Systems, Houston	APEX Query/EIS Facility	Corporatewide reporting tool
Blackwell Software BSP, Ltd., Oxford, England	Idealist for Windows	Information manager
Desktop Ai, Fairfield, Conn.	X2c - The Portable Xbase compiler	Xbase to C compiler
Fleming Systems Corp., Thunder Bay, Canada	4SITE	Maintenance and materials management
Persistent Data Systems, Inc., Pittsburgh	IDB Object Database	Distributed object database
Spinnaker Software, Cambridge, Mass.	Personal Access	Database access and reporting tool
Tippecanoe Systems, Inc., Pleasanton, Calif.	Document Manager	Document management

Server database applications

Company	Product	Description
Ace Software Corp., San Jose, Calif.	AceFile 2.0 for Windows	Data manager
Arbor Software Corp., Santa Clara, Calif.	eSSbase and eSSbase Applications Server	Data analysis server for spreadsheets
Canaan Analytics, Inc., New Castle, Del.	Canaan Query	SQL database query tool
Cincom Systems, Inc., Cincinnati	SUPRA and SUPRA Server	Open database server
FairCom Corp., Columbia, Mo.	FairCom r-tree	Report generator
	FairCom c-tree Plus	Library of data management functions
	FairCom Server NT	Transaction processing database server
	FairCom SQL Server NT	Transaction processing database server with SQL engine
Gupta Corp., Menlo Park, Calif.	SQLBase and SQLBase Server	Relational database server
Informix Software, Inc., Menlo Park, Calif.	Informix-SE	Relational database server for LANs
Ingres, Alameda, Calif.	Ingres Intelligent Database for Windows NT	Relational database server
Micro Decisionware, Boulder, Colo.	Database Gateway for Windows NT	Mainframe data access
Objectivity, Menlo Park, Calif.	Objectivity/DB	ODBMS for C and C++
Oracle Corp., Redwood Shores, Calif.	Oracle7 Server for Windows NT	Relational database server
PACE Systems, Inc., Cypress, Texas	SQL Watch	SQL server performance monitor
POET Software Corp., Santa Clara, Calif.	POET ODMS Version 2.0, Personal and Professional editions	Cross-platform ODMS for C++
Servio Corp., San Jose, Calif.	GemStone	ODMS
	GeODE	Visual development environment
Sharptex Software Development Corp., Gresham, Ore.	Sharptek 32-bit Database Development Tools	32-bit C and C++ database development tools
Sybase, Inc., Emeryville, Calif.	Sybase SQL Server	Relational database server
Versant, Menlo Park, Calif.	Versant ODBMS	Object-oriented database management
VMark Software, Inc., Framingham, Mass.	uniVerse	Multiuser business application environment
XDB Systems, Inc., Laurel, Md.	XDB-Server for Windows NT	DB2-compatible, LAN-based database system

Networking development tools

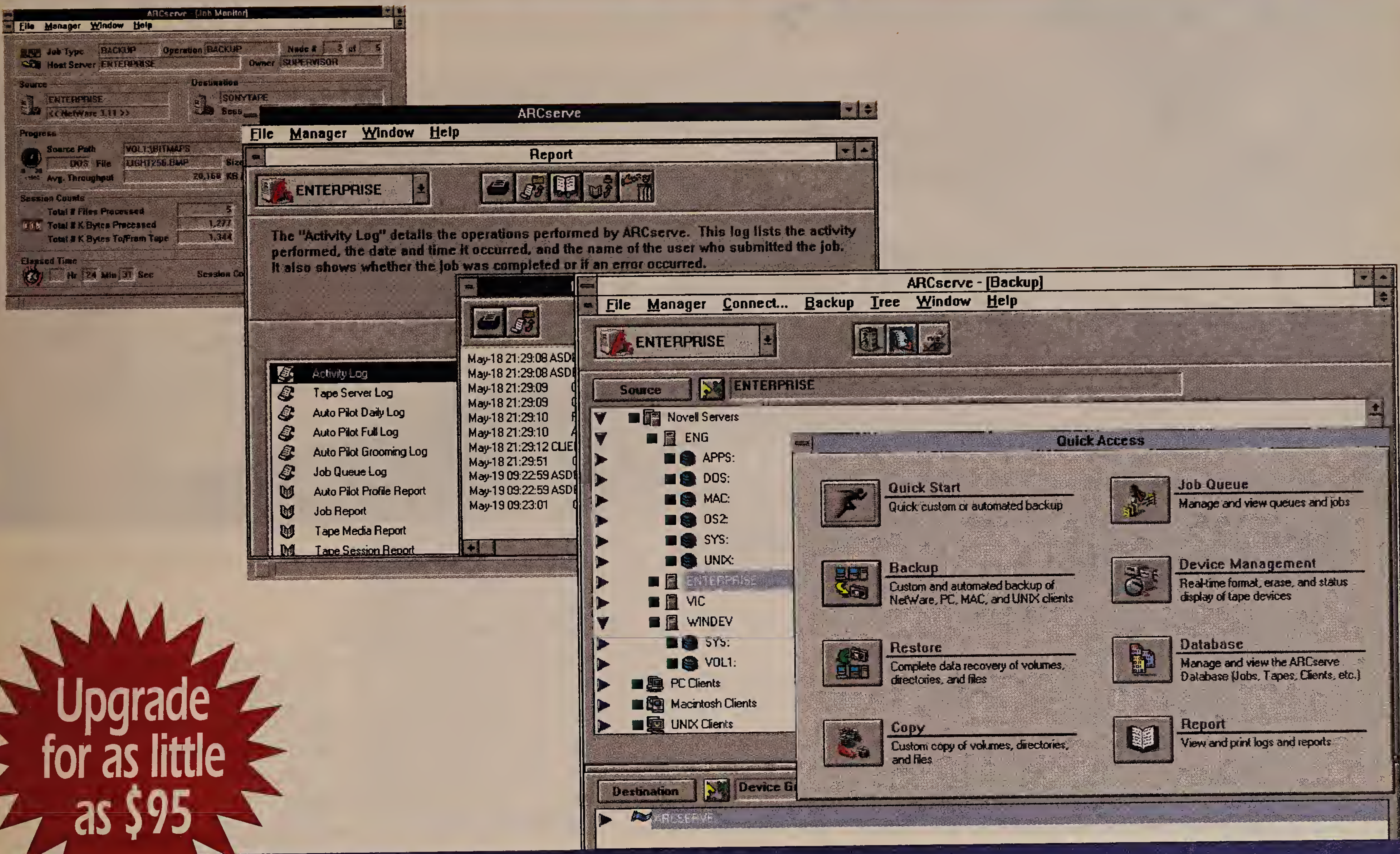
Company	Product	Description
Attachmate Corp., Bellevue, Wash.	Automation Development Kit for Windows NT	Automates mainframe access and interaction
Data Micro Systems, Beaverton, Ore.	DMS/XNT	X Window display device server
Digital Equipment Corp., Littleton, Mass.	Pathworks for Windows NT Programmers Kit	Incorporates DECnet support into NT applications
	ACA Services	Builds applications across multiple platforms and network protocols
	APPC Developers Tool kit for Windows NT	LU 6.2 protocol to communicate with APPC standards
Eicon Technology Corp., Lachine, Quebec	SNA Function Management Developer's Toolkit for Windows NT	Flexible environment for accessing SNA hosts
Fourth Wave Technologies, Inc., Troy, Mich.	WinBEEP/NT SDK	Wireless messaging development
JSB Corp., Scotts Valley, Calif.	Remote Execution Kit	Client/server application program interface to Unix
Magna Carta Software, Garland, Texas	C Communications Toolkit/NT	Communications development
NetLogic, Inc., New York	Cezanne	Rapid application development tool for mission-critical applications
Peakdesign, Oakland, Calif.	VBX 6.2	APPC connection custom control
PeerLogic, Inc., San Francisco	PIPES Platform	Client/server and peer-to-peer application development platform
Nevis Technologies, Inc.	Nevisys NT	Enterprise development environment
Symbiotics, Inc., Cambridge, Mass.	NetWorks	Client/server and peer-to-peer development tools
Template Software, Inc., Herndon, Va.	SNAP	Object development environment for distributed applications
Third Eye Software, Inc., Menlo Park, Calif.	Elexir InterLink	Hypertext document development

Connectivity applications

Company	Product	Description
Applied Innovation, Inc., Worthington, Ohio	NetVisor	Monitors AISwitch network fabric
Attachmate Corp., Bellevue, Wash.	EXTRA for Windows NT	3270 connectivity
Beame & Whiteside Software, Ltd., Ontario	BW-Services	Network File System (NFS) and TCP/IP client/server utilities
Capella Systems, Inc., Atlanta	SmartScreen/Open	Coprocessing client for access to Professional Office System (PROFS) or OfficeVision/VM
Control Data Systems, Inc., Landover, Md.	Vista-eXceed	X Window server
	VistaCOM for Windows	Communications and terminal emulation
Creative Systems Programming Corp., Mt. Laurel, N.J.	Golden ComPass NT	Uses NT to access Microsoft technical support on CompuServe
Digital Equipment Corp., Littleton, Mass.	PathWorks Version 4.1 for Windows NT	Integration with corporate information systems environments
	DECtp Desktop for ACMS	Database application program interface (API)
	DECmessageQ for NT	Messaging API
Distinct Corp., Saratoga, Calif.	Distinct TCP/IP - TCP - Tools	Multiple Telnet sessions, File Transfer Protocol drag and drop, FTP client/server and more
Eicon Technology Corp., Lachine, Quebec	Access for Windows NT 3270	32-bit 3270 emulation
Fourth Wave Technologies, Inc., Troy, Mich.	WinBEEP/NT	Wireless messaging
Frontier Technologies Corp., Mequon, Wisc.	Super-TCP/NFS Apps	TCP/IP and NFS networking applications
FutureSoft, Houston	DynaComm/Elite	3270 emulation
Hummingbird Communications, Inc., Markham, Ontario	HCL-eXceed for Windows NT	X Window server emulation and client support
JSB Corp., Scotts Valley, Calif.	MultiView DeskTop	NT-to-Unix connectivity
	MultiView X	X Window server emulation
KEA Systems, Ltd., Burnaby, B.C.	KEAterm 340	VT-340 and VT-420 emulation
Mobile Solutions, Inc., Mt. Airy, N.J.	MX2000 Wireless Communications Processor	Integration with wireless mobile data networks
NetManage, Cupertino, Calif.	Chameleon32	TCP/IP for Windows NT
Network Computing Devices, Inc., Beaverton, Ore.	PC-Xware for Windows NT	X Window server emulation
Network Logics/Computer Logics, Scottsdale, Ariz.	LinkUp SNA Services for Windows NT Stand Alone 2.0 and LinkUp SNA Services for Windows NT Client/Server 2.0	IBM host and LAN SNA connectivity for desktop and LAN users
Passport Communications, Austin, Texas	Win 3770	3770 emulation
Peakdesign, Oakland, Calif.	DDE 6.2	APPC DDE extension
Persoft, Inc.	SmarTerm 340 for Windows NT	VT series emulation
P.I. Technologies, Chatsworth, Calif.	RDCL/NT	Remote VAX connectivity
RCE, Cergy Pontoise, France	RCE-OSI/NETBIOS	OSI transport protocols
ROI Company, Inc., Atlanta	OI/COM/400	Real-time, serial port connectivity to AS/400 hosts
Salt River Systems International, Scottsdale, Ariz.	SRSI->FORD	Multiprotocol connectivity to Tandem Computers, Inc. systems
Sitka Corp., Alameda, Calif.	OpenTOPS	Peer-to-peer networking in mixed environments
Software Corp. of America, Stamford, Conn.	TalkThru for Windows	Host communications
Wall Data, Inc., Redmond, Wash.	Rumba	IBM host connectivity
	Rumba for the AS/400	AS/400 connectivity
	Rumba for the Mainframe	3270 and APPC connectivity

SOURCE: MICROSOFT CORP., REDMOND, WASH., AND *NETWORK WORLD*

POINT, CLICK, ENTERPRISE BACKUP.



Job Type BACKUP Operation BACKUP Node # 2 of 5
Host Server ENTERPRISE Owner SUPERVISOR
Source ENTERPRISE << NetWare 3.11 >>
Destination SONYTAPE
Progress
Source Path VOL1:\BITMAPS
DOS File LIGHT256.BMP
Avg. Throughput 20,160 KB
Session Counts
Total # Files Processed 5
Total # K Bytes Processed 1,277
Total # K Bytes To/From Tape 1,344
Elapsed Time Hr 24 Min 31 Sec

The "Activity Log" details the operations performed by ARCserve. This log lists the activity performed, the date and time it occurred, and the name of the user who submitted the job. It also shows whether the job was completed or if an error occurred.

- Activity Log
- Tape Server Log
- Auto Pilot Daily Log
- Auto Pilot Full Log
- Auto Pilot Grooming Log
- Job Queue Log
- Auto Pilot Profile Report
- Job Report
- Tape Media Report
- Tape Session Report

```
May-18 21:29:08 ASD
May-18 21:29:08 ASD
May-18 21:29:09
May-18 21:29:09
May-18 21:29:10
May-18 21:29:10
May-18 21:29:12 CLIE
May-18 21:29:51
May-19 09:22:59 ASD
May-19 09:22:59 ASD
May-19 09:23:01
```

- Novell Servers
  - ENG
    - APPS:
    - DOS:
    - MAC:
    - OS2:
    - SYS:
    - UNIX:
  - ENTERPRISE
  - VIC
  - WINDEV
    - SYS:
    - VOL1:
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Circle Reader Service #22

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- Save on upgrade of IBM-3174
- Connect IBM-3274 to LAN
- Substitute cost-effective converters for pairs of bridges
- Local SDLC polling saves WAN bandwidth
- Route SNA/SDLC traffic over IP backbone using any major vendor's router
- Save on management costs (and NCP fees)
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FTC	FEP to Token Ring converter, supports up to 15 PU type 2.0 LAN connected devices
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FEC	FEP to Ethernet converter
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Circle Reader Service #24

Moving

Continued from page L7

in modular form. For example, SynOptics is form-fitting Kalpana's switch into its hub, while UB is developing its own switch module, dubbed DragonSwitch.

"There are a number of emerging technologies that are promising users more bandwidth, but Ethernet switching has a big advantage: It is here and requires the least amount of change to your network," said Michael Howard, president of Infonetics Research, Inc., a consultancy in San Jose, Calif. "Your adapters and wiring can remain in place as only the hub requires tweaking. It's attractive because it delivers more bandwidth with little alteration at a reasonable price."

The ultimate goal, however, is to move from networking on a packet-by-packet basis to an environment that operates on an application-by-application approach. That is the promise of the virtual LAN model.

In a virtual LAN environment, the location of devices and end nodes is a secondary consideration. "A virtual LAN is a logical grouping of devices on a network without respect to physical location," said Sonia Jiandani, a product manager at UB. "The real appeal is the user can create work groups that overlap, so any port can actually be part of any number of subnets."

Running as software on the hub, a virtual LAN capability allows the net manager to create multiple virtual subnets. Instead of grouping users under the banner of a particular network, the net manager groups users together according to the applications they need to access.

On the floor of the stock exchange, for example, one set of users may need access to Server A, while a second set wants access to Server B. The net manager can provide each group with secure access to its respective server and let both groups access the E-mail application so they can communicate.

UB and Alantec are the only two vendors offering virtual LAN capabilities.

By combining this type of capability with the switching features of the per-port networking environment, users can overcome the limitations of shared-bus architectures, where applications are contending for the same amount of bandwidth.

The virtual LAN capability can also allow users to reduce the number of bridge/routers needed in a hub. Since all logical subnets are basically sharing the same backplane, only one bridge/router is needed to switch traffic between the various segments.

"Virtual LAN is basically groupware for the LAN, where the network relies on objects," Fowler said. "The decision process moves up the ladder in terms of the application deciding which users have access. Since it functions at the application layer, the physical location of the devices doesn't matter."

UB and Alantec are the only two vendors offering virtual LAN capabilities. UB, for example, through its Virtual LAN Architecture — which is compatible with its entire product line — allows net managers to create as many as 65,000 virtual work groups or net segments with its Access/One intelligent hub. ☒

Sun

Continued from page L2

purposes. Developing and implementing client/server architectures is part of the picture, Freund said, but SunNetworks will leave development of net applications to third parties.

The new unit fits between Sun's recently revamped support operations (*NW*, April 26, page 13) and its extensive collection of systems integrators. Freund, formerly of IBM and more recently president and chief executive officer at Interconnect Network Consulting Group, Inc. in Santa Monica, Calif., said SunNetworks intends to augment Sun's systems integration partners by providing a focused approach. But observers said that at least some degree of competition seems inevitable.

The new business unit has the dual purpose of creating its own revenue and profits, as well as making Sun products more attractive to networking customers, Freund said. Typical SunNetworks customers "will [already] have a relationship with Sun," Freund said, but the consulting services contract "may not be tied directly to a product deal."

Freund said that the growing start-up will be incubated within the SunConnect business unit. Then, after a year or two, "we'll spin it out into its own separate [Sun] planet," he said.

SunNetworks will be based in SunConnect's facilities here, but will also operate offices in Sun's Mountain View, Calif., headquarters and in Washington, D.C. International services will be provided out of offices in Europe and the Far East, out of a Tokyo hub.

When it begins formal operations in October, Freund said, SunNetworks will employ 20 to 35 people. The company is currently recruiting almost equally from within Sun and from the industry at large. ☒

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CANOGA PERKINS

Circle Reader Service #21

Sifting through the internet options

BY SONI JIANDANI AND MICK SCULLY

Routers, bridges and local-area network switches are technologies that have evolved as a result of LAN proliferation and the need to create logical subnetworks.

But some of the benefits they provided are similar, making it difficult to decide where to use what. Before selecting any of these options, it is important to understand the differences between them and their various applications.

Bridges and routers evolved to segment local-area nets, link them across campus backbones and facilitate LAN/WAN integration. While bridges addressed network segmentation at the physical layer, they could not be used as fire walls between segments to prevent broadcast and multicast traffic from polluting the backbone. To resolve this problem, routers were developed.

VENDOR VIEW

Routers have gained popularity because they are intelligent, protocol-aware devices that filter traffic between LAN segments and provide a higher level of security with extensive packet filtering capability. These features are critical to building a corporate backbone network, and, as a result, routers have evolved to become a crucial fabric of the network for all information systems across the enterprise.

A new class of products called LAN switches have emerged to provide some of those same functions while excelling at still others. Switches, for example, are significantly faster than routers and have lower latency, the processing delay within a device between receiving and retransmitting a packet.

Latency indicates the performance of real-time interactive traffic between end stations communicating over such a device. Bridges/routers typically will receive and process multiple packets before packet transmission. Therefore, high latency is traded for features desirable in the internetworking, multiprotocol environment.

Ethernet switches, in comparison, receive and process each packet on the fly, in real time, providing low latency, high switching rates and throughput in the LAN.

SWITCH EVOLUTION

Some early Ethernet switches were completely hardware-based, with functionality restricted to switching packets across ports based on media access control layer addresses.

These switches offered no reliable means of forwarding traffic. As soon as a packet address was detected on a port, the packet was sent off; no validity checking of the entire packet was possible. In other words, while early hardware switches were faster and less expensive than bridges and routers, their architecture was inflexible and their functionality limited.

Despite these shortcomings, as networks with bridges and routers grew, users began to turn to the less expensive, faster and easier to maintain switches to further extend hierarchical internetworks.

The resulting demand spurred the evolution of a second generation of Ethernet switches employed a combination of Application Specific Integrate Circuit (ASIC) technology, as well as microprocessors and memory to provide a variety of capabilities not possible in earlier generations of hardware-centric switches.

These devices offer on-the-fly switching with validity checking and can also facilitate creation of logical networks with full on-board management capabilities that integrate both physical and logical segments — a technology that offers the bandwidth without any physical barriers.

These types of switches, which are integrated into LAN hubs with high-speed switched backplanes, make it possible for network managers to achieve the ultimate connectivity objective — providing a dedicated 10M bit/sec segment between only two end users over a high-speed switched hub backplane.

The switches also support the creation of completely separate, logical subsets of an enterprisewide network on demand using software. The resulting "virtual workgroup" architecture differs from the physical network segmentation available on some multibackplane hubs by supporting a virtually unlimited number of software-configurable, geographically dispersed, logical network segments.

DEPLOYMENT

While switches are certainly highly functional, they are not intended to replace routers and bridges. Each technology has an appropriate use. For example, in very large networks with several thousands of nodes, routers or bridges — depending on the protocols involved — will maintain more efficient traffic flow con-

See **Internet**, *page L14*

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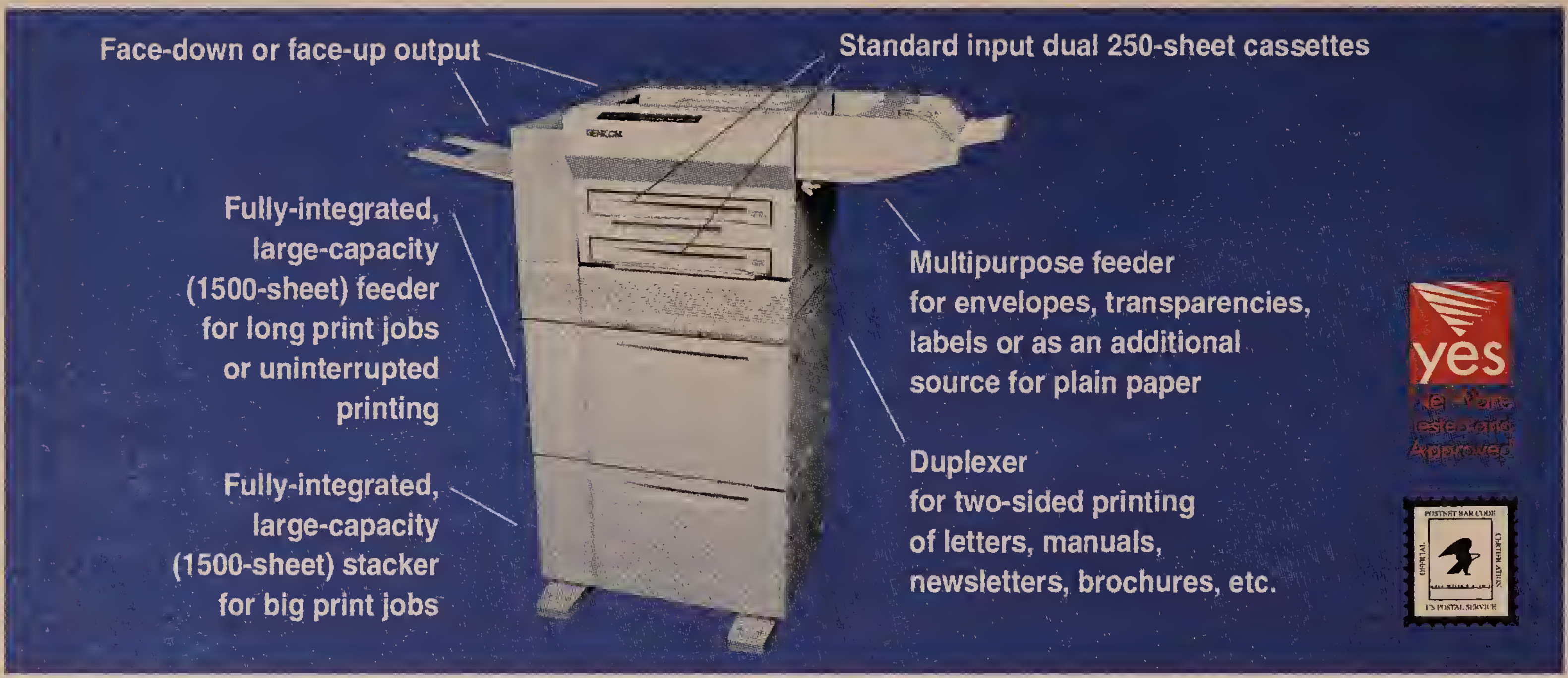
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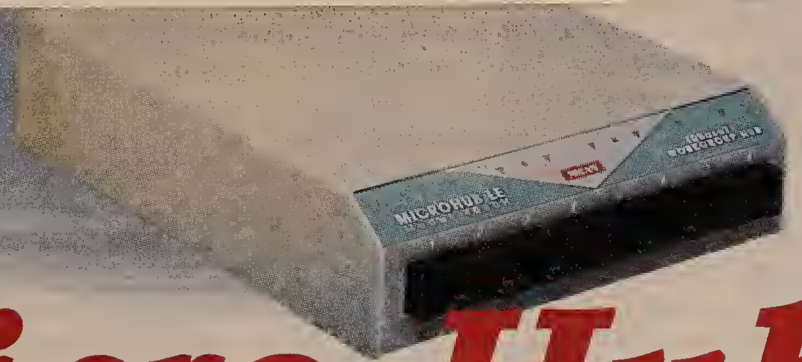

Micro-Hub LE

Distributed workgroup hubs presented cabling problems in a 10BaseT environment until now.

How many times have you wired a 10BaseT network only to find out that thinnet, thicknet, fiber, or non-standard twisted pair cabling is required to connect to the rest of the world. The Micro-Hub LE lets you get to the backbone at the flip of a switch because it has all the standard Ethernet transceivers built-in at no extra cost.

The Micro-Hub LE is the perfect solution for your non intelligent hub requirements. It has twelve diagnostic LEDs giving per port and global status on network conditions. And its attractive packaging features a rugged aluminum enclosure. MiLAN's Micro-Hub LE also comes standard with an unparalleled five year warranty.

Multiple uplink cabling configurations allow for placement everywhere . . .

Micro-Hub LE features:

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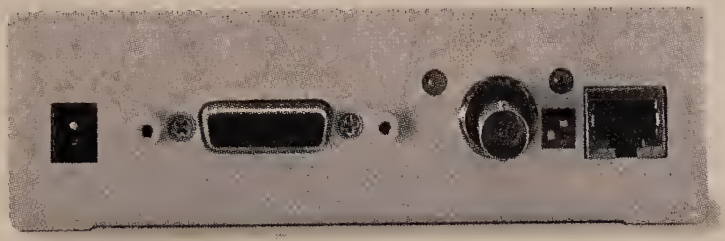

The Micro-Hub LE comes standard with all three uplink cabling types making an effortless installation in any Ethernet environment.

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Circle Reader Service #23

U.K. firm's E-mail pack links multiple LANs and services

BY ELIZABETH HEICHLER

London

Finansa, Ltd. has announced an electronic mail product that lets users connect to multiple LAN-based E-mail systems as well as several public mail services.

Available for personal computers running Microsoft Corp. Windows or IBM OS/2 2.0, Remote WinMail lets remote users dial into local-area network-based E-mail systems that comply with Novell, Inc.'s Message Handling Service. In addition, subscribers to the IBM Mail Exchange service and CompuServe can now use Remote WinMail to access those public networks.

"We see a huge growth in demand for remote access," said Gavin Whichello, Finansa's president and chief executive officer. "Very few major E-mail software vendors are positioned for what the major corporations want, which is connectivity to multiple systems and existing systems such as the IBM Mail Exchange."

IBM Information Solutions, Ltd. of the U.K., which runs the IBM Information Network that supports the Mail Exchange, joined Finansa for the Remote WinMail launch.

"We were looking for something for the stand-alone user, and we started talking to Finansa last year," said Gary Salvidge, opportunity manager at the Information Network. He said that Remote WinMail's ease of installation and use, as well as its ability to connect to multiple back ends due to built-in gateways, make it a good solution for remote or stand-alone Information Exchange users.

Remote WinMail uses Windows features such as drag and drop and is designed as a Dynamic Link Library so that mail services can be integrated into the menus of most current Windows applications, allowing users to send messages from within Microsoft's Word for Windows or Excel, Lotus Development Corp.'s AmiPro, or WordPerfect Corp.'s WordPerfect for Windows, for example. It also provides rules-based filtering and sorting of messages into user-defined folders.

A feature designed to make life easier for frequent travelers lets users preconfigure settings for a variety of locations; when the user selects the current location from a list, the system is reconfigured to use the appropriate telephone numbers and modem settings.

Remote WinMail will be available in an English-language version in July, priced at £199 ($299). Finansa plans to launch additional language versions for the European market at the end of June.

Internet

Continued from page L12

trol than switches alone.

In networks consisting of a few work groups, a high-speed, low-latency switch would be appropriate, but for enterprisewide large networks with many work groups, a hybrid network strategy with both switches and routers will be required.

The deciding factor should be based on future needs for bandwidth within and to the hub. In a hybrid net scenario, switches and routers or bridges can be combined to create a truly flexible net architecture.

In such a network, one would typically deploy routers in the backbone to guarantee availability, security, redundant paths, and extensive network management and control. Switches can be deployed at the periphery of the network, closer to the work group or end-station since they provide higher performance to the desktop, offering simple operation and a lower cost per port.

Take the case of a large corporate headquarters facility that has a distributed Fiber Distributed Data Interface backbone with campus servers and host dual-homed on the FDDI ring. Assume the network also is now equipped with hubs containing switches to provide high-speed connectivity for work groups and the desktop and bridge/routers to connect the hubs to the backbone. As subnets grow, if they require further segmentation, a hub-based switch is likely to provide a more cost-effective solution than a multiport router.

A combination of routers and switches is sometimes necessary to balance low latency with high reliability. Switches are also ideally designed for high-performance work groups, dedicating Ethernet segments for power users and supporting future applications such as multimedia on existing wiring.

Until technologies such as Asynchronous Transfer Mode are fully deployed, today's increasing business dependence on networking mandate Ethernet switching and internetworking. By carefully selecting the best technology for end users, achieving highly reliable point-to-point communications can be cost-effectively established across the enterprise.

HP security

Continued from page L1

attachment unit interface link for thick coaxial cable and fiber-optic connections.

The hub also uses Advanced Micro Devices, Inc.'s Hardware-Implemented Management Information Base (MIB)/Integrated Multiport Repeater chipset, which monitors all net traffic traveling across the hub, compiling statistics on the number of frames transmitted and collisions, among other conditions.

The Plus/24 will be available this week and costs $2,995, or $115 per port.

While providing security at the work group level with the Plus/24, HP will also beef up its net management offerings for those LANs with two Windows-based software packages.

OpenView Workgroup Manager and Interconnect Manager, which can run on 386-based personal computers, will allow net managers to control and monitor devices in multivendor work group nets as well as automate many common management tasks.

Workgroup Manager automatically discovers which devices are on the work group LAN — including hubs, printers, PCs, and Novell, Inc. NetWare clients and servers — and then builds a hierarchical network map depicting the net topology.

The applications can be scheduled to rediscover all network devices at regular intervals, enabling it to keep track of new devices added to, or existing devices removed from, the net.

By clicking on an icon, network managers can control EtherTwist hubs and monitor multivendor SNMP-based Internet Protocol or Novell's Internetwork Packet Exchange (IPX) devices. Managers can also browse through MIBs from HP and other vendors and graph standard MIB II counters and HP's private MIB extensions.

Interconnect Manager offers a superset of the Workgroup Manager capabilities and provides management of interconnected work group LANs.

Workgroup Manager is available now and costs $2,000, while Interconnect Manager, also available now, is tagged at $4,000.

☎ HP: (800) 752-0900.

SynOptics to port Optivity to OpenView

BY SKIP MACASKILL

Santa Clara, Calif.

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"By combining Optivity with OpenView, users can get a complete view and control of their enterprise from an end-to-end management perspective," said Jim Goetz, product-line manager for net management at SynOptics.

SynOptics will also provide its RouterMan and PathMan LattisWare Solution applications on OpenView. RouterMan lets managers see status and configuration information on routers, while PathMan tracks the path of a packet from one end of a connection to the other, assessing the health of all the devices along the way.

The Premier Partner label is a significant one, according to Scott Safe, OpenView's marketing communications manager. "Premier is the highest level of integration that a third-party supplier can achieve," he said. "It means that Optivity will be the first intelligent network management application to be certified by HP."

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☎ SynOptics: (408) 988-2400.

Apple's Scully hands off CEO job, stays on as chair

BY FREDRIC PAUL

Cupertino, Calif.

As Apple Computer, Inc. Chairman John Scully handed his position as CEO to President Michael Spindler, the company faces perhaps the most turbulent times in its short history.

As Apple forecasts lower than anticipated earnings for the next two years, a dwindling market share despite increases in Macintosh shipments, and the cost of moving into corporate networking, one expected consequence is layoffs — estimated at between 700 and 2,000 people — that could begin as early as this week.

Scully insists, however, that his move has nothing to do with Apple's troubles, but rather a desire to concentrate on the future and possible strategic alliances with companies in other industries. It has been one year since Apple's landmark deal with IBM, and reports were circulating last week that Apple was about to announce a joint venture arrangement with AT&T, although both companies declined to comment.

Pieter Hartsook, editor of The Hartsook Letter, a Macintosh market research service in Alameda, Calif., said that, short term, the transfer of power would have little effect.

"It's more of a name change than anything else,"he said. "Spindler is going to keep on doing what he's been doing, and Scully is going to keep on doing what he's been doing. In the long run, however, this is actually an exit strategy for Scully."

Scully, 54, wants to run a company at the center of the convergence of computers, communications and consumer electronics, Hartsook said. While Apple will be involved, it will remain primarily a computer manufacturer.

In the meantime, Spindler, 50, takes over the day-to-day running of the company. President and chief operating officer of Apple since 1991, Spindler is known as a smart, hands-on manager who keeps a low public profile. Scully has been grooming Spindler for the chief executive officer post for a number of years, according to a company spokesperson.

POSSIBLE LAYOFFS

As for possible layoffs, the spokesperson reiterated that Apple "will take aggressive action to get expenses back in line" in the wake of the disappointing earnings projections. The company is considering many options, the person said, and would not rule out layoffs.

The layoffs, totaling 5% to 15% of the company's more than 14,000 employees, are expected to affect much of the company, including the once-sacrosanct research and development operations.

Apple has "a fairly standard design center for the next four to five years," Hartsook said.

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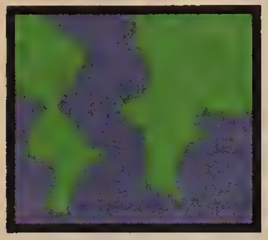

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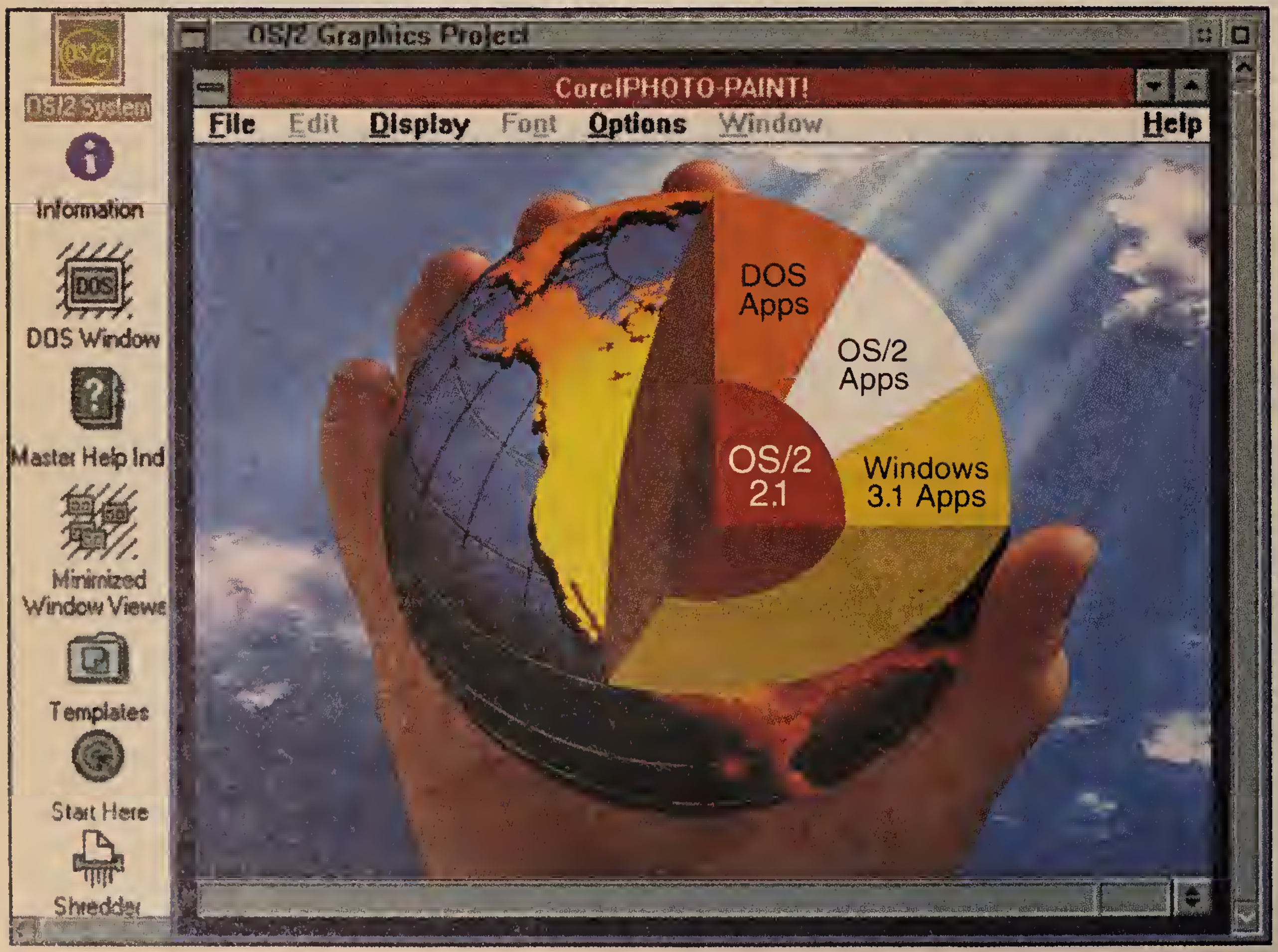

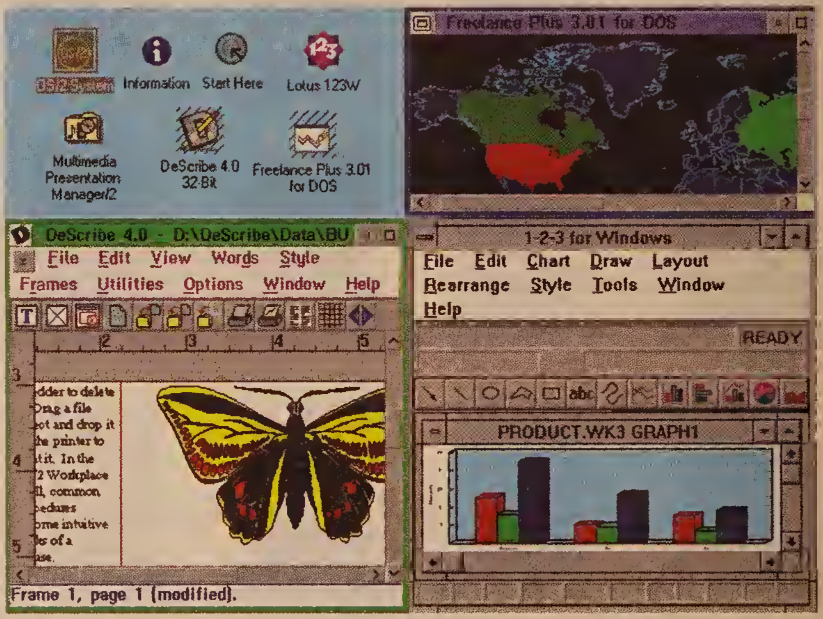

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Company also anticipates a turbulent transition.

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REASONS FOR MOVE

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"With the PowerPC hardware all lined up," according to Hartsook, Apple has "a fairly standard design center for the next four to five years," so R&D budgets are likely to be cut.

The company will probably switch R&D hardware to software, he added. Z

SynOptics to port Optivity to OpenView

BY SKIP MACASKILL

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In conjunction with that move, HP also announced that SynOptics will become an HP OpenView Premier Partner, meaning the companies will conduct joint marketing and sales activities.

These efforts will include things such as technical training, product demonstrations and trade show participations, with the goal of more tightly integrating the Optivity application with the OpenView platform.

Optivity, which now runs on all the major management platforms, is a Simple Network Management Protocol management application that supports all the devices that make up what SynOptics calls the network fabric, including hubs, bridges and routers.

In 1990, SynOptics had provided net management for HP's Windows-based version of OpenView via its LattisNet Manager for DOS. Two years later, SynOptics had made its Lattis Views software available on HP's OpenView Network Node Manager.

"By combining Optivity with OpenView, users can get a complete view and control of their enterprise from an end-to-end management perspective," said Jim Goetz, product-line manager for net management at SynOptics.

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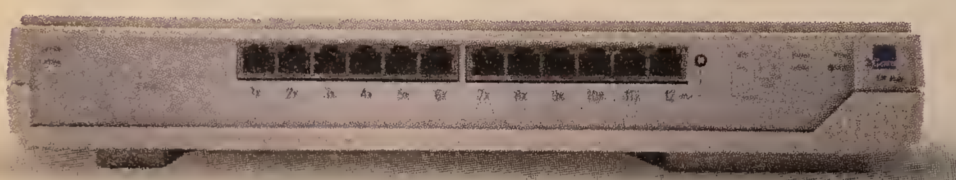

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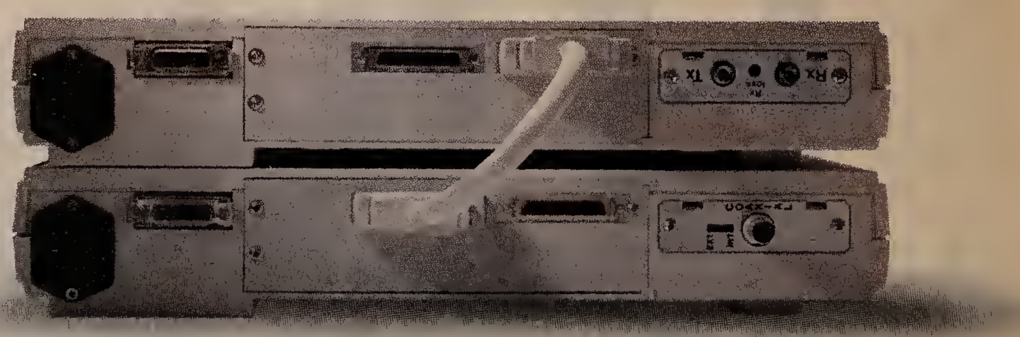

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SynOptics will also provide its RouterMan and PathMan LattisWare Solution applications on OpenView. RouterMan lets managers see status and configuration information on routers, while PathMan tracks the path of a packet from one end of a connection to the other, assessing the health of all devices along the way.

"The partnership has a two-fold significance for users," Goetz said. "On one hand, it will give current OpenView for Unix users a comprehensive option for managing their network fabric devices from layers one through three. On the other hand, it also lets users tie into HP's leadership in the [Distributed Management Environment] area, which was one of the major reasons SynOptics wanted for Optivity on OpenView."

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✆ SynOptics: (408) 988-2400.

U.K. firm's E-mail product links LANs

BY ELIZABETH HEICHLER

London

Finansa, Ltd. has announced an electronic mail product that lets users connect to multiple LAN-based E-mail systems as well as several public mail services.

Available for personal computers running Microsoft Corp. Windows or IBM OS/2 2.0, Remote WinMail lets remote users dial into local-area network-based E-mail systems that comply with Novell, Inc.'s Message Handling Service.

In addition, subscribers to the IBM Mail Exchange service and CompuServe can now use Remote WinMail to access those public networks.

"We see a huge growth in demand for remote access," said Gavin Whichello, Finansa's president and chief executive officer. "Very few major E-mail software vendors are positioned for what the major corporations want, which is connectivity to multiple systems and existing systems such as the IBM Mail Exchange."

IBM Information Solutions, Ltd. of the U.K., which runs the IBM Information Network that supports the Mail Exchange, joined Finansa for the Remote WinMail launch.

"We were looking for something for the stand-alone user, and we started talking to Finansa last year," said Gary Salvidge, opportunity manager at the Information Network. He said that Remote WinMail's ease of installation and use, as well as its ability to connect to multiple back ends due to built-in gateways, makes it a favorable solution for remote or stand-alone Information Exchange users.

Remote WinMail uses Windows features such as drag and drop and is designed as a Dynamic Link Library so that mail services can be integrated into the menus of most current Windows applications, allowing users to send messages from within Microsoft's Word for Windows or Excel, Lotus Development Corp.'s AmiPro, or WordPerfect Corp.'s WordPerfect for Windows, for example. It also provides rules-based filtering and sorting of messages into user-defined folders.

A feature designed to make life easier for frequent travelers lets users preconfigure settings for a variety of locations; when the user selects the current location from a list, the system is reconfigured to use the appropriate telephone numbers and modem settings.

Remote WinMail will be available in an English-language version in July, priced at £199 ($299). Finansa plans to launch additional language versions for the European market at the end of June. ▣

HP security

Continued from page 17

hubs, printers, PCs, and Novell, Inc. NetWare clients and servers — and then builds a hierarchical network map depicting the net topology. The applications can be scheduled to rediscover all network devices at regular intervals, enabling it to keep track of new devices added to, or existing devices removed from, the net.

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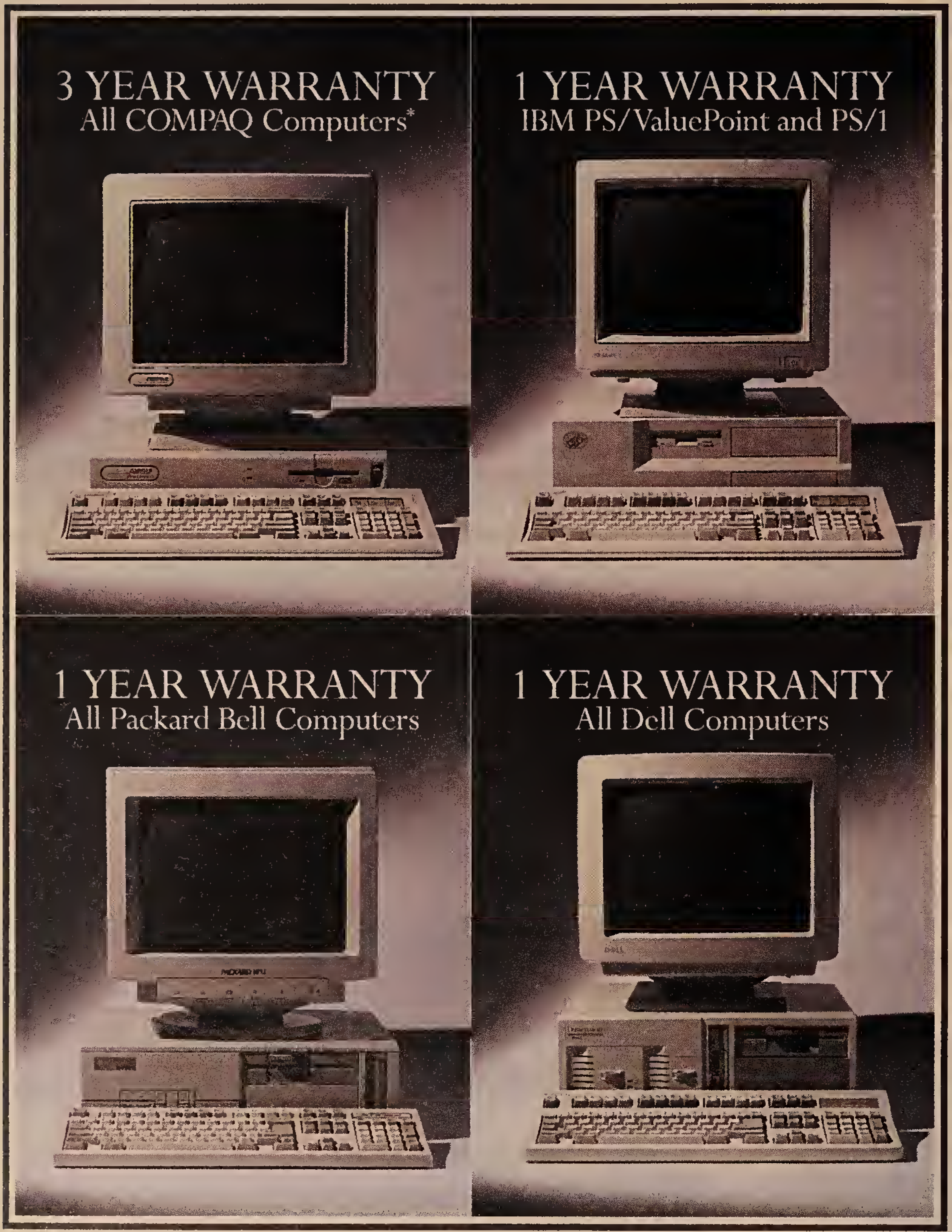

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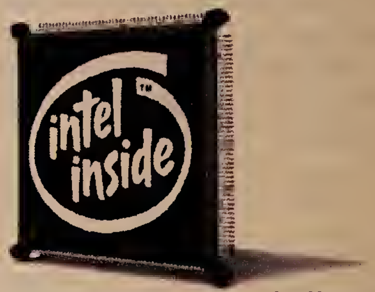

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Circle Reader Service #10

Novell

Continued from page 17

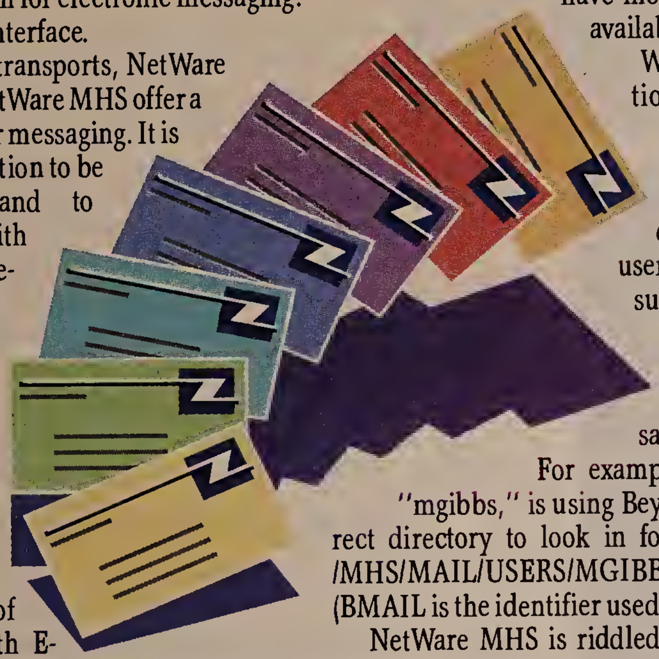
figuration. Novell has added considerable functionality to NetWare Global MHS but failed to clearly explain the architecture.

The final shortfall is complexity. As with all products that survive the rigors of the marketplace, it has evolved to include new or enhanced functionality. The cost of this evolution for NetWare Global MHS is complexity in installation, configuration and management.

DISTINGUISHING FEATURES

The difference between NetWare Global MHS and other LAN messaging systems is that, like NetWare MHS, it is purely a back-end transport mechanism for electronic messaging: It has no front-end interface.

Being back-end transports, NetWare Global MHS and NetWare MHS offer a broad foundation for messaging. It is easy for any application to be message-enabled and to communicate with any other message-capable application, regardless of whether that application is on a NetWare MHS- or NetWare Global MHS-based system.



There is an extensive catalog of applications — both E-mail applications and mail-enabled software such as calendaring systems — that are NetWare MHS-compliant and therefore NetWare Global MHS-compliant. There are more interoperable applications for NetWare MHS than there are for any other LAN messaging transport.

NetWare Global MHS differs from other messaging systems in how it is tied to the NetWare file server system. NetWare Global MHS consists of a number of NetWare Loadable Modules (NLM), processes that operate inside the NetWare environment.

Before you can understand NetWare Global MHS, you need to have a good grasp of the history and technology of NetWare MHS. Novell's NetWare MHS is a product with a long and complex history. It started in the mid-1980s as the embedded messaging back end of the Coordinator, a groupware product from Action Technologies, Inc.

The back end was ultimately spun off as a separate module called the Message Handling System and was acquired lock, stock and source code by Novell in 1990. The front end — the groupware part — is now the Coordinator marketed by Da Vinci Systems Corp. of Raleigh, N.C.

When Novell took over MHS, a new enthusiasm for the product was generated. Placing it in a newly formed division, the NetWare Messaging Products Group, and renaming it NetWare MHS confirmed that Novell was at last getting serious about messaging.

The biggest boost NetWare MHS received was the formation of the MHS Alliance, a consortium of vendors that use MHS in their products. The group's objective is to promote MHS as a standard and establish interoperability testing and validation. With currently 35 members, the alliance will probably do more to establish NetWare MHS as a major de facto standard than Novell has been able to do so far.

The basic concept behind NetWare MHS is fairly simple. It uses a file-based application program interface (API) that provides an interface between the messaging system and applications. Applications sending messages would put their data into files in a standard format and then place the files in specific directories. The NetWare MHS programs deliver the messages to both local and intersystem addresses.

For example, the /MHS/MAIL/SND directory is where an application places messages, each in its own file, to be sent to another address. The actual routing and transfer of messages is handled by a "postman" service referred to as a Message Transfer Agent.

This is a DOS-based program that runs on a network workstation. If transferring between remote sites is required, the workstation must have modem connections available.

When an application wants to see if there are messages waiting, it checks the subdirectory for the user name and the subdirectory under that for the target application to which the message is addressed. For example, if a user, say "mgibbs," is using BeyondMail, the correct directory to look in for mail would be /MHS/MAIL/USERS/MGIBBS/BMAIL (BMAIL is the identifier used by BeyondMail).

NetWare MHS is riddled with terms from the Open Systems Interconnetion X.400 standard.

MHS is an X.400 term that stands for Message Handling System, but NetWare MHS is not X.400-compliant. Novell also refers to the postman component as the Message Transfer Agent, but it is not an X.400 Message Transfer Agent.

The postman function under NetWare MHS, Connectivity Manager, can be configured to call remote MHS systems on a scheduled basis. It is part of a DOS application that also allows the net manager to configure modem connections, define users and other MHS hosts, and manage message queues.

When message exchange with "alien" systems is required, MHS can be set to run gateway processes. These gateways are just DOS programs that connect to the alien service, send mail that has been queued for export by the postman and receive mail. The incoming mail is then placed in a queue for the postman to route to the required user.

NetWare Global MHS differs in the connectivity oprions it offers the LAN environment and the fact that it is implemented as and NLM suite.

ENTER NETWARE GLOBAL MHS

NetWare Global MHS is related to MHS in its support of the same APIs, support of a superset of the messaging format and interoperability at the transport level.

It differs in the connectivity options it offers for the LAN environment and in the fact that it is implemented as an NLM suite. The latter is important because it removes the need for a workstation on the network to run the postman components but increases the number of failure points in the file server environment.

That is not to suggest that NetWare Global MHS is unstable or unreliable. The basic requirements for installing NetWare Global MHS are a minimum of 11M bytes of random-access memory, 8M bytes of disk space and whatever serial ports or internal modem cards are needed for external connections.

NetWare Global MHS can be installed as a new system or used to upgrade an existing NetWare MHS environment. If the installation is an upgrade, you can migrate existing accounts and configuration data for remote MHS host systems and gateways to the new system. Installation is not time-consuming but convoluted.

NetWare Global MHS is more like a complete new system rather than an upgrade to NetWare MHS. It offers compatibility with the previous releases, a new sophisticated messaging model and an expanding range of gateways.

The superset of the messaging format that NetWare Global MHS uses is a Novell specification called Standard Message Format (SMF) 71. This extends the previous SMF 70 in many ways, including allowing extended addresses.

In SMF 70, user names were limited to eight characters, but with SMF 71,full names can be used.

Another addressing extension is the support for hierarchical addresses. Prior to Version 71, an E-mail address would have consisted of a foreshortened name tied to a location with an @ sign — for example, "mgibbs@gyre." SMF 71 allows a root work group — for example, the company name — and any number of sub-work groups. The only restriction is that the total length of an address must not exceed 253 characters.

There are some rather curious restrictions on address formats, however. Names containing more than 64 characters without a space are illegal. While this is not likely to affect many people, it is one of those technical support problems that will cause nightmares for some.

The ability to specify hierarchical work group names should be mandatory for messaging systems intended to support large companies. They allow the structure of a company to be reflected in addresses. A root work group is defined for each NetWare Global MHS server, and all servers that use that name belong to the same work group.

If you are upgrading to NetWare Global MHS, all addresses will be translated when NetWare MHS systems using SMF 70 (or even the older SMF 64) are linked. In fact, all aspects of previous SMF versions are translated by NetWare Global MHS systems so no data is lost.

Since this increases the complexity of the directory of user names, directory synchronization has been implemented as a core service. Now NetWare Global MHS servers can be configured to exchange their directory information on schedule with one another and with NetWare MHS systems, although there are restrictions on how this operates for the latter.

If Simple Mail Transfer Protocol (SMTP) or Systems Network Architecture Distribution Services (SNADS) support is loaded, directory exchange can be carried out with those systems, as well. Directory exchange can also be done across serial links. Messaging pipelines are another new NetWare Global MHS feature. In NetWare MHS systems, servers communicate using direct connections between pairs of MHS servers.

Pipelines are a new facility that let the user create common channels, rather like virtual circuits, between NetWare servers on a LAN. Pipelines are different from server-to-server links in that the latter must be set up and configured for each destination server.

Servers on pipelines can find and communicate with any other server on the pipeline without preconfiguration. In enterprisewide networks, this makes system setup far simpler.

Other than the pipeline connections, NetWare Global MHS supports serial links to MHS servers. The range of supported modems is good, but problems may arise if you want to use a modem that is not listed.

As shipped, NetWare Global MHS also offers support for standard COM ports and a few intelligent asynchronous cards. Unless these intelligent cards are used, problems such as lost data and high error rates may crop up in connections faster than 2,400 baud.

Another feature is embedded document translation, which allows for third-party NLM-based document translators to automatically convert document formats before delivery. One word processing user with WordPerfect, for example, could send documents to a Microsoft Word user without the recipient taking any action to make the document usable.

Today, the only available NLM third-party offering for document translation is KeyPak NLM from KeyWord Office Technologies, Inc. in Calgary, Alberta. The product supports conversions between Microsoft Word (for personal computers and Macintoshes), WordPerfect 5.X, Microsoft Rich Text and other formats.

KeyWord also offers document translation for other platforms such as MVS and VM, so its support for NetWare is pretty sophisticated.

To exchange messages with alien systems, Novell has released NLM-based protocol modules that support IBM's SNADS, SMTP and, most importantly, full-fledged X.400 support from Retix. These add significant expense to a NetWare Global MHS installation, but they are still much less expensive for messaging systems supporting a few thousand users.

To support currently used gateways, NetWare Global MHS comes with a support program called gwdaemon, which runs on a workstation. The program simply acts as a minimal subset of the old NetWare MHS connectivity manager that runs the gateway and handles the integration of the gateway messages with the NetWare Global MHS system.

Novell's NetWare Global MHS is a significant upgrade to NetWare MHS. It provides a whole range of services that are crucial for turning LAN-based electronic messaging into a communications strategy. With the inclusion of support for standards such as SMTP, SNADS and X.400, and reputed scalability to large environments, NetWare Global MHS is designed for enterprisewide networking.

Once Novell completes the next version — which will integrate NetWare Global MHS with NetWare 4.0's NetWare Directory Services — it will be far easier to control messaging in a coordinated way with other NetWare network services.

✏ Gibbs is a writer and consultant based in Ventura, Calif. As a contributing editor for Patricia Seybold, Inc., he is currently developing a report on Novell's MHS technology due to be published next month. He can be reached through CompuServe at 75600,1002 or by calling (805) 647-2307. His latest book, *The Absolute Beginner's Guide to Networking* (Sams Publishing), is now available.

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Circle Reader Service #19

BROADBAND

Sprint primps for ATM debut

BY BILL BURCH

Officially, Sprint Corp.'s ATM launch is scheduled for the end of the third quarter. But as the date approaches, the carrier is leaking details of the offering, and building awareness and expectations.

Sprint is pressing forward with its Asynchronous Transfer Mode service rollout, despite losing, for the time being, an important Department of Energy (DOE) ATM contract due to an AT&T protest over bidding procedures. The carrier is resubmitting its bid to the DOE and expects it to be reconsidered by the end of the summer.

Meanwhile, Sprint continues to work toward its general ATM launch, with initial deployment plans calling for a five-switch network. So far, the carrier has installed TRW, Inc.'s Broadband Access Switch 2010 in Burlingame and Stockton, Calif., and a third TRW switch is now in operation near Baltimore. A fourth goes on-line soon in Chicago, leaving only the location of one final switch to be announced.

Future decisions on whether to backhaul traffic or install more switches will be made as demand develops, according to Cathy Gadecki, Sprint's product manager for ATM services.

Users will tie into the service over a DS3 connection but will likely be billed according to actual traffic volume. Such pricing should appeal to users that are uncertain as to what their actual network traffic patterns will be, said Greg Crosby, director of ATM/broadband services for Sprint Data Group. By mid-1994, Sprint plans to have a 155M bit/sec Optical Carrier (OC)-3 connection, followed by a 622M bit/sec OC-12 connection a year later.

The switch to ATM will be a slow evolution, Gadecki believes, and the 45M bit/sec connection is intended to fall in line with today's user requirements.

See **Sprint**, *page 28*

LESAT instructors broadcast live using satellite-based videoconferencing network.

University delivers training via satellite

BY ELLEN MESSMER

Knoxville, Tenn.

More than 2,000 law enforcement officers across the state are using a satellite-based service run by the University of Tennessee to receive required training on legal and operational issues.

Through programming put together by the university's Law Enforcement Satellite Academy of Tennessee (LESAT), police and sheriff departments in far-flung rural areas can now obtain access to the expertise of instructors they might not otherwise be able to afford.

"Our officers, when they go into court, are required to know Tennessee law," said Kenneth Burton, executive director of the University of Tennessee Center for Telecommunications and Video, which runs the satellite network.

The programming, put together by the university, educates the officers in Tennessee regulation, forensic

See **University**, *page 28*

Sequent moves to nat'l frame relay net

Computer maker saves $30,000 a year and offers better access to host applications.

BY BOB WALLACE

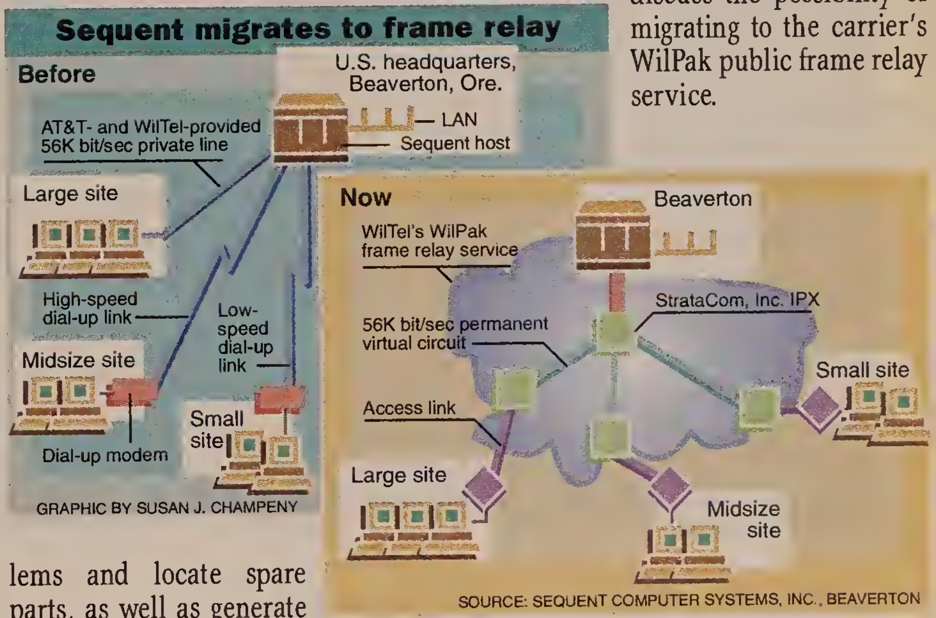
Beaverton, Ore.

Sequent Computer Systems, Inc. last week said it has replaced its hybrid public/private network with a 25-node nationwide frame relay net provided by WilTel, a move that saved Sequent $30,000 in 1992 alone.

Before frame relay, Sequent salesmen and technicians at various sites had used everything from low-speed dial-up connections to 56K bit/sec private lines to design computer networks for potential users and access customer support data.

"Network modeling is an iterative process," said Jeff Mulick, network services manager for Sequent. "We couldn't tolerate long call setup periods and huge turnaround times when files were exchanged using electronic mail."

The host also runs applications that enable its field work force to access a listing of sales leads, track customer problems and locate spare parts, as well as generate sales quotes and proposals, Mulick said.


Sequent migrates to frame relay
Before
U.S. headquarters, Beaverton, Ore.
LAN
Sequent host
AT&T- and WilTel-provided 56K bit/sec private line
Large site
High-speed dial-up link
Low-speed dial-up link
Midsize site
Small site
Dial-up modem
Now
Beaverton
WilTel's WilPak frame relay service
StrataCom, Inc. IPX
56K bit/sec permanent virtual circuit
Small site
Access link
Large site
Midsize site

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: SEQUENT COMPUTER SYSTEMS, INC., BEAVERTON

Before frame relay, network modeling and application access was a fairly arduous task for all but those sites with private links to the computer vendor's hosts.

Midsize offices relied on multiple modem-like devices to establish 57.6K bit/sec dial-up links, and small sites used expensive low-speed, dial-up connections.

It took 30 to 45 seconds to establish dial-up links to the host, and response times were so bad that workers at many Sequent sites opted to send files using E-mail, which took anywhere from 15 to 30 minutes.

"If our typical end user was going to sit down and use the system for two hours straight, the 30 to 45 seconds needed to establish a connection wouldn't have been a problem," Mulick said. "However, [end users employed] the service for short periods throughout the day. This made the service a hindrance."

Worse still, in an effort to contain costs, Sequent had connected many of its East Coast locations through its Washington, D.C. office so each site didn't need a separate, distance-priced 56K bit/sec leased link to the computer maker's headquarters here.

"We saved money by taking this approach, but we found out later that the 56K-bit Washington, D.C.-to-Beaverton link had congestion problems, Mulick said.

Recognizing the limitations of its configuration, Sequent had been monitoring emerging transmission technologies when WilTel initiated a meeting to discuss the possibility of migrating to the carrier's WilPak public frame relay service.

In the first quarter of 1991, Sequent decided to beta-test the carrier's service. The computer maker put up a three-site, 30-day trial frame relay network in parallel with a portion of its leased-line network, Mulick said.

Pleased with the performance, Sequent decided to migrate all of its sites to the offering. The migration was completed without incident by year-end 1991.

Sequent installed Cisco Systems, Inc. AGS, IGS or CGS routers at most of its 25 U.S. locations, each of which support at least three Ethernet local-area networks.

Each router is tied to a 56K bit/sec

See **Sequent**, *page 29*

BRIEFS

Pacific Bell has awarded **AT&T, Pacific Access Computers, Inc.** and **Resource One** contracts totaling $40 million for a system that will help the local carrier catch network problems before they interrupt or knock out service.

The AT&T system is called Total Network Management (TNM) and comprises software from AT&T that runs on fault-tolerant hosts provided by Pacific Access Computers and Resource One.

TNM will look at thousands of network event messages from more than 600 central offices in California, sort through the information in seconds and provide Pacific Bell net managers with data that indicates potential network problems.

Pacific Bell said the AT&T software will enable it to more quickly restore interrupted service and improve disaster recovery for its business customers.

Sprint Corp. has announced a joint marketing agreement with Ontario-based **CallStream Communications, Inc.** to sell the vendor's voice processing systems to hotels.

VoiceStream systems support voice mail, automated attendant, voice recognition and facsimile features. The systems can be integrated with most leading private branch exchanges and property management systems.

Securicom, a Valenic, Calif., marketing arm of **Teltrol Systems**, announced its Fraudfinder family of toll fraud monitoring products have met compatibility standards for AT&T's NetProtect Advanced and Premium toll fraud monitoring services.

The testing of the products was conducted in March and June at AT&T Bell Laboratories' Test Facility in Holmdel, N.J. The four products tested are: Fraudfinder, a disconnect system; Phoneblock, a trunk lock system; Portguard, a barrier system for maintenance ports; and Fraudfinder 500, a debit card system for direct-inward system access and access to long-haul carrier services.

Securicom: (805) 294-9121.

Asia/Pacific carriers see fiber future

Net modernization driven by competition.

BY BOB WALLACE

Newport, R.I.

The market for fiber-optic cable and equipment in the Asia/Pacific region is expected to soar from $1.3 billion last year to $4 billion in 1998 as carriers brace for competition and modernize their networks, according to a recent report.

"Asia/Pacific Fiberoptics Market," a report by the consulting firm KMI Corp. here, said the fastest growth is coming from countries such as China, Indonesia and Malaysia where fiber is being deployed in an effort to leapfrog copper and microwave links.

The figures in the graphic cover shipments of fiber-optic cable, transceivers and connectors for local and long-haul voice and data links.

Competition is playing a major role in the modernization of carrier nets in the region.

"The privatization and deregulation of the telecommunications sector in the Asia/Pacific region will bring new services and accelerate the growth of the fiber-optic market," said Charles Xu, an analyst with KMI.

Japan started the privatization of its telecommunications industry in 1985, and Nippon Telegraph and Telephone Corp., formerly a national telecommunications monopoly, now competes with numerous carriers, the report said.

Deregulation has also spread to other Asia/Pacific countries. In 1987, the Malaysian government privatized Jabatan Telecom Malaysia and formed a new company, Telekom Malaysia. Just last year, Singapore Telecom was privatized. This year, Telstra, a newly merged company of Telecom Australia and Overseas Telecommunications Corp. will compete with Optus Communications, which started up last year as the second Australian carrier. And there's further deregulation planned.

Xu said Taiwan plans to turn its state-run PTT — the Directorate General of Telecommunications — into a private corporation this year.

The KMI study covers developments in Australia, China, Hong Kong, Indonesia, Japan, Korea, Malaysia, New Zealand, the Philippines, Singapore, Taiwan and Thailand.

Competition is playing a major role in the modernization of nets in the Asia/Pacific region.

Although all of these countries will contribute to the growth of the regional fiber-optic market, the highest growth will not come from the largest markets. Japan and Australia's combined 70% market share will drop to 59% in 1998, the report says. The rest of the Asia/Pacific markets will grow faster.

Requirements for fiber-optic cable and hardware vary significantly among countries. Japan, with less than 2% of the area and 8% of the population in this region, accounted for more than half of the total revenue in the market last year.

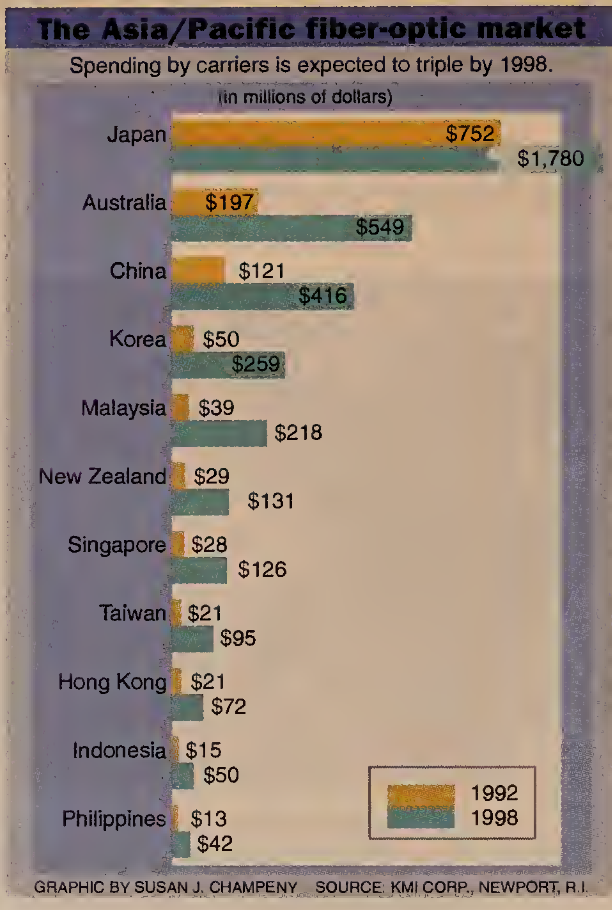
By contrast, China, Malaysia, Indonesia, the Philippines and Thailand, with nearly 60% of the area and more than 90% of the population, accounted for only 16% of the market's revenue in 1992, the report says.

KMI's report segments fiber-optic applications by long-haul systems, which are interstate or interprovince links, and feeder/local systems, which include metropolitan networks or fiber loops.

The report says revenue from long-haul fiber and equipment in the Asia/Pacific region will decrease from 1992 through 1998, while feeder/local systems will dominate the market, growing from 40% this year to 64% in 1998.

The Asia/Pacific fiber-optic market

Spending by carriers is expected to triple by 1998.



GRAPHIC BY SUSAN J. CHAMPENY SOURCE: KMI CORP., NEWPORT, R.I.

Sprint launch

Continued from page 27

"The CPE's capability to drive a line at this time falls in nicely with the DS3 rate," Gadecki said.

Sprint is trying to decide whether to charge for the service based on the amount of data transmitted or the length of time a user is connected.

Another pricing consideration is deciding on available classes of service. ATM's boast has always been its ability to handle voice, video and data simultaneously, but that versatility makes pricing tougher. For example, the carrier will need to have pricing for both variable bit rate traffic, such as data, and continuous bit rate streams typical of voice and video.

Gadecki expects the first ATM applications to include LAN interconnection, host connection, disaster recovery and electronic vaulting. Other applications likely will be high-bandwidth imaging for supercomputer users and videoconferences. Early adopters may put voice traffic on the net as soon as 1995.

Gadecki may be right about ATM's potential, but demand for the service remains uncertain, according to Chris Finn, a senior analyst with TeleChoice, Inc. a Verona, N.J., consultancy.

In the general public, only customers needing mesh connectivity will migrate to ATM; for users with a limited number of sites to connect, carriers will keep T-3 lines priced low enough so they remain attractive, according to Finn.

Bud Huber, chairman of the ATM user forum, said he sees most users getting their feet wet with the service by installing internal networks to try out net management and security features. When they are comfortable with the technology, users will finally install wide-area networks for such applications as computer-aided design and manufacturing file sharing, which could happen within a year, he said.

Huber would applaud a Sprint decision to price ATM services on a usage basis but thinks the user community will still need ATM rates below 45M bit/sec. Experts are currently debating such lower rates, with some saying ATM's cells are too long to be used at speeds below T-3. Still, Huber believes such rates will be needed for the service.

University

Continued from page 27

analysis and safety procedures for handling dangerous situations ranging from domestic violence to drug enforcement.

Use of the satellite system, which costs each law officer about $8 per three-hour session, is voluntary. While some Tennessee counties continue to use their own training programs, the satellite-based system is now used by law officers from 84 departments statewide.

The university's one-way video and two-way audio satellite system allows officers to ask questions after a training program is aired. And after an exam is given and scored, the instructor — whose image beamed to 55 satellite dishes across the state — discusses what the correct answers were and why. The officers earn in-service training credits after passing short tests given at each session.

"We're like an extension to the law enforcement academy," said Burton, who noted that the broadcasts are encrypted for security reasons.

The LESAT system uses equipment from Scientific-Atlanta, Inc. to provide the uplink to a Ku-band satellite service provided by Boston-based Global Access Telecommunications Services, Inc. Burton recommends that users buy a movable satellite dish supporting both Ku- and C-band frequencies so, once a videoconferencing room is established, it can also be used to pick up programming from sources other than LESAT.

The LESAT program, which began about three years ago, had a rocky start, said Terry Nichols, chief of police at the Maryville, Tenn., police department.

The university's original lecture format received bad reviews from police officers that had to sit through the six-hour broadcasts. Nichols said his police department did not subscribe to the network until the university improved its format last year. The improvement involved cutting the sessions to three hours each, adding prerecorded action-packed vignettes and including smaller jurisdictions through a look at local initiatives, such as bicycle patrols and citizens' police academies.

LESAT's satellite transmission time and production costs reach about $280,000 per year, Burton said. Curriculum design and delivery costs another $20,000. A $120,000 state grant got the satellite-based program off the ground, but Nichols now worries LESAT may not be able to survive unless new financial support can be found.

PSI provides Internet access for PC users

BY ELLEN MESSMER

Herndon, Va.

Performance Systems International, Inc. (PSI) next month will ship two new software packages that provide Internet access for personal computers running Microsoft Corp.'s Windows and Hewlett-Packard Co.'s HP 95LX palmtop computer.

PSILink Electronic Mail for Windows, software that PSI provides as part of its Transmission Control Protocol/Internet Protocol-based value-added network, lets Windows users send electronic mail over both the Internet and RAM Mobile Data, Inc.'s wireless service.

PSILink Electronic Mail for Windows carries a onetime $19 sign-up fee and costs $9 per month for an Internet connection at modem speeds between 1,200 and 2,400 bit/sec, and $19 per month for 9.6K bit/sec modems.

PSI's price for V.32 support, which runs at 14.4K bit/sec — the highest modem speed the Windows-based Internet access software will support — starts at $29 per month.

The second new software package, Version 2.0 of PSILink for the HP 95LX palmtop, supports the TCP/IP File Transfer Protocol in addition to E-mail. When used with RAM Mobile Data's network, it only supports messaging.

PSILink for the HP 95LX also has a onetime $19 sign-up fee and costs $19 per month for dial-up speeds between 1,200 and 2,400 bit/sec, and $29 per month for 9.6K bit/sec dial-up speeds.

Both PSI packages allow users to receive the feeds they want from the Internet's popular bulletin board service, USENET News.

PSI offers Internet access

Scheduled to ship July 1:

PSILink Electronic Mail for Windows

Supports:
- V.32 and 1,200-9,600 baud modems
- RAM Mobile Data, Inc.'s wireless network

PSILink for the Hewlett-Packard Co. HP 95LX palmtop computer

Supports:
- E-mail
- File Transfer Protocol
- A "News" folder to receive wire-service news feeds

SOURCE: PERFORMANCE SYSTEMS INTERNATIONAL, INC., HERNDON, VA.
GRAPHIC BY SUSAN J. CHAMPENY

PSI slashed $10 per month off all its Internet services, with the lowest price now set at $9 per month for PSILink Lite, the 1,200 to 2,400 bit/sec Internet E-mail service that also allows wireless access to the Internet via the RAM Mobile Data network.

☎PSI: (703) 904-7187.

Sprint to resell consortium's EDI, E-mail business services

BY BILL BURCH

Washington, D.C.

Looking to broaden its marketing reach, the Microelectronics and Computer Technology Corp. (MCC) research consortium last week announced that it has signed Sprint Corp. to resell its business services, including EDI and E-mail.

Sprint will sell the Enterprise Integration Network (EINet) services to business users, while MCC continues to target trade associations and other large organizations.

Based in Austin, Texas, MCC is a research consortium with some 80 members. The group's work includes research and information management, intelligent systems and distributed systems management.

The partnership is part of MCC's attempt to fashion a new electronic forum for commercial transactions where users can exchange electronic mail and swap electronic data interchange and electronic funds transfer files.

Services on the new network will cover electronic funds transfer, advanced electronic mail and information services. Security for controlling network access and directories by listing and subject will also be provided.

One of MCC's biggest challenges will be persuading users to switch from current E-mail, electronic funds transfer and EDI systems. MCC and Sprint will also face tough competition from service providers.

"The whole name of the game now in EDI is to be able to...provide one connection and then to do all the enabling and support that's required to [let] trading partners conduct their business," said Mark Winther, an analyst with LINK Resources in New York. He wonders where MCC and Sprint will fit into an already crowded field and believes that the alliance's appeal to Sprint is the chance to build up an EDI business that now comes mostly from a few Federal Telecommunications System 2000 contracts.

Sprint plans to sell to current EDI and E-mail customers. Its sales executives say they will target customers by industry — a necessity considering the webs of industry relationships that define current E-mail, electronic funds transfer and EDI connections.

In their sales pitches, Sprint's staff will show how the network offers multimedia capabilities not yet seen in most other systems. But the downside of such glitz is the large pipes required for transmission.

At a recent demonstration, MCC and Sprint showed off the service using a T-1 connection. Sprint must convince businesses that the network's advantages merit paying for such high-speed lines.

Sprint will connect users to a network over its Transmission Control Protocol/Internet Protocol SprintLink data service. Monthly data service rates run from $500 per port for 9.6K bit/sec connections up to $2,700 for a T-1 link; customer premises equipment costs $600 per month for the higher speeds.

MCC's pricing for EINet services range from several hundred to several thousand dollars per month based on the organization's number of users and locations and the speed of the connection. ☑

Sequent

Continued from page 27

access port on a StrataCom, Inc. IPX switch in the WilTel network, except here where a T-1 access port is used. The permanent virtual circuits are not permitted to burst above the 56K bit/sec committed information rate.

"The sites that had used private lines got a slight improvement [in performance] that was not noticeable to our users," Mulick said. "The sites that noticed the greatest performance improvements were those on the East Coast that were sharing the line with Washington. The congestion on that line went away."

Mulick's words of wisdom: You can run your mission-critical applications on frame relay. I can't understand why there has not been greater acceptance of the service.

But costs plummeted by roughly 30%. The savings in the first year alone paid for the routers.

The company said that managing the frame relay network is much easier than managing its old net. As a result, the company's technical staff is spending less time helping support a three-tier network and more time writing new applications, according to Mulick.

The network is also proving to be at least as reliable as the old network, and the company said it is pleased with WilTel's support. ☑

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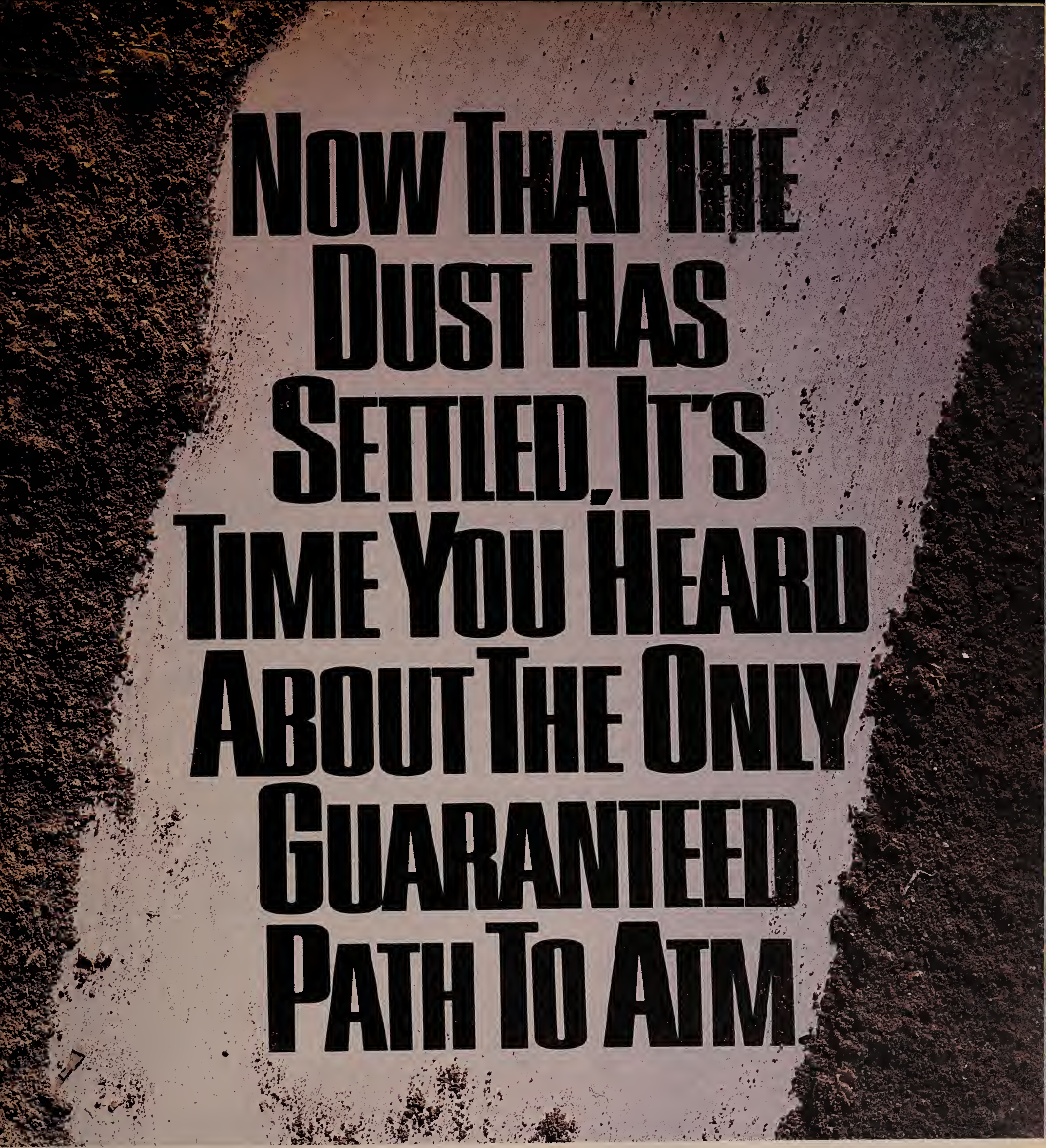
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ELECTRONIC MAIL

E-mail vendor Notework buys ON Technology

BY BOB BROWN

Cambridge, Mass.

Notework Corp., a vendor of Novell, Inc. Message Handling Service-based electronic messaging software, this week will announce the acquisition of ON Technology, Inc., a vendor of Apple Computer, Inc. Macintosh group scheduling software here.

The acquisition enables Notework and ON Technology to integrate their respective electronic mail and scheduling products.

In addtion, it gives Notework entree to the Macintosh market, as it looks to deliver a Macintosh version of its E-mail, while giving ON Technology access to expertise in the Novell and Microsoft Corp. Windows markets as it looks to pitch its schedulers there.

Terms of the acquisition were not disclosed by the companies, both of which are privately held.

The combined company, which will be based in a new facility here and use the ON Technology name, has an installed base of more than 500,000 end users.

ON Technology Chief Executive Officer Conall Ryan will become the combined entity's chairman, while Notework President Christopher Risley will become the firm's CEO.

RIZZI
ON Technology

The acquisition will enable the integration of ON Technology's Meeting Maker software for Macintosh and Windows users with Notework Electronic Mail for DOS and Windows, as well as other E-mail packages, said John Rizzi, vice president of strategic marketing at ON Technology and previously vice president of sales at Notework.

"There is an obvious need to do that — all schedulers need a mail component," he said. Meeting Maker does not have E-mail hooks today, he said.

See **Notework**, *page 34*

BRIEFS

The Asynchronous Protocol Specification (APS) Alliance has announced the completion of a draft specification for sending X.400 electronic mail messages over dial-up lines. Isocor and MaXware have already demonstrated early products supporting the specification.

APS Alliance: (800) 267-7737.

Distributed Systems Solutions International, Inc. (DSSI) has announced a suite of Lotus Notes 3.0 administrative utilities that produce consolidated reports of Notes database and replication activity and changes in the design of Notes applications on Notes servers, among other things. The utilities cost $995 each per server and will be available this summer.

DSSI: (818) 991-0200.

Object Design, Inc. (ODI) of Burlington, Mass., announced that ObjectStore will store objects created using IBM's System Object Model (SOM). SOM allows users to create binary class libraries of object software, regardless of the programming language employed.

Itasca Systems, Inc. has announced that it is shipping an interface for the CLOS programming language, allowing users to store CLOS objects in the Itasca distributed object-oriented database.

The Minneapolis-based firm also announced interfaces to the Ada and Eiffel programming languages.

The Itasca database allows users to create and manipulate objects developed in different programming languages and change database schema dynamically.

Cincom adds new twist to distributed databases

Offers "optimistic" two-phase commit technology.

BY WAYNE ECKERSON

Cincinnati

While most database vendors such as Ingres and Oracle Corp. offer two-phase commit technology for synchronizing updates among distributed databases, few users have deployed the technology because of its complexity and sluggish performance.

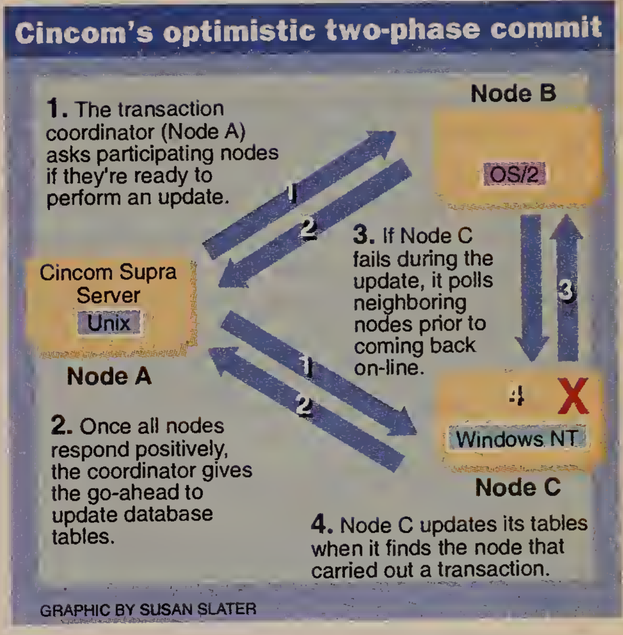
Cincom Systems, Inc., based here, believes it has overcome most of the deficiencies of two-phase commit technology in its newest release of Supra Server. Supra Server 3.1, available in the third quarter, contains a feature called Transaction Partners, which is an optimistic form of two-phase commit that supports a higher percentage of completed transactions, higher availability of data and less network overhead than traditional two-phase commit technology, according to Cincom officials.

Unlike replication services that asynchronously reflect updates to a master database in one or more remote databases, Transaction Partners maintains data integrity across multiple nodes in real time.

"Users say that replication is a necessary evil today because two-phase commit technology is too complex and the cost of communications is too high. Ideally, users want to be able to transparently access and update data regardless of where it's kept and what platform it's running on," said David Bunker, senior director of marketing and business planning at Cincom.

Besides Transaction Partners, Supra Server 3.1

See **Cincom**, *page 39*


Cincom's optimistic two-phase commit

Node B
OS/2
1. The transaction coordinator (Node A) asks participating nodes if they're ready to perform an update.
1
2
Cincom Supra Server
Unix
Node A
3. If Node C fails during the update, it polls neighboring nodes prior to coming back on-line.
3
1
2
4
X
Windows NT
Node C
2. Once all nodes respond positively, the coordinator gives the go-ahead to update database tables.
4. Node C updates its tables when it finds the node that carried out a transaction.

GRAPHIC BY SUSAN SLATER

Edify offers new Electronic Workforce

BY BOB BROWN

Santa Clara, Calif.

Edify Corp. this week will announce a new version of its work flow software that can be used with existing DOS-, Unix- and OS/2-based personal computer and client/server applications to automate tasks.

Edify's Electronic Workforce 2.2, which is available now, is designed to automate the retrieval and delivery of information across a network by using work flow technology combined with voice and facsimile response technology. Electronic Workforce software can be used to perform a variety of tasks, mostly in sales, service and support operations.

The new version of Edify's software will work with local-area network-based electronic mail systems, such as Lotus Development Corp.'s cc:Mail, as well as client/server applications, such as PeopleSoft, Inc.'s human resources software. For example, the Edify software can read and interpret an inquiry about benefits made by an employee via cc:Mail, retrieve the requested information from a database and send it to the employee via E-mail. Previously, the Edify software worked with host-based applications as well as telephone and facsimile systems.

GLASSANOS
Edify Corp.

"The host-based systems that have taken advantage of Electronic Workforce are fairly structured in their processing," said Jamie Popkin, program director in the office information systems service at Gartner Group, Inc., a Stamford, Conn., market research firm. "By extending the software to the LAN-based environment, Edify is going after the more unstructured work processes as well."

Edify's core Electronic Workforce software runs on an Intel Corp. 80486-based PC running OS/2 and equipped with fax and voice cards, said Tom Glassanos, vice president of marketing at Edify.

The software supports two to 20 centrally located software agents that replicate actions that would otherwise be performed by people, such as sending a fax or E-mail message, or answering a phone, he said.

Edify's basic PC and client/server support is for character-based applications, but the company has also added support for dynamic link libraries (DLL) to enable access to Windows applications. The DLL support will also enable Edify's software agents to access applications via various application program interfaces, including SQL for database access.

Edify's Electronic Workforce 2.2 ranges in price from $10,000 to $70,000, depending upon the number of agents needed.

Current customers will receive a free upgrade under their standard service agreement, although there is an additional $500 piece of software required on the LAN.

☎Edify: (408) 982-2000.

IBM lets third parties in on product line

BY CARA CUNNINGHAM

IDG News Service
Boston

IBM's Programming Systems line of business has backed up the company's new client/server strategy with glimpses at future product plans.

At Database World and Client/Server World here, IBM's Programming Systems group said it will modify the company's IMS database to allow access from third-party products. The group also committed to allowing future releases of DataHub, a database management tool, to work with non-IBM databases and to porting DB2 to third-party operating systems in addition to those from Hewlett-Packard Co. and Microsoft Corp., which was previously announced.

The plans support the strategy outlined by IBM's Client/Server Computing unit, which has pledged to promote access to common technologies across a range of computing platforms. IBM's IMS database, which has been running on IBM mainframes for 25 years and has more than 7,000 licenses worldwide, will gain "openness" in mid-1994, said Pat Romero Cronin, IMS product manager in San Jose, Calif.

IBM will add to IMS a "cross-coupling facility to provide Sockets for access from [technologies such as] TCP/IP and [remote procedure call]," Cronin said. Any vendor will be able to write to this interface to give its product access to information stored on IMS, she explained.

This enhancement will open the corporate data repository and make mainframes more useful, Cronin added. In the nearer future, the group plans to release a tool that will build graphical user interfaces for 3270 terminal programs, Cronin said. This product is scheduled for release before the end of the year.

"My definition of client/server is anyone, anytime, anywhere, any form," said Tom Furey.

IBM's DataHub, which will be released at the end of this month, will also be enhanced to interact with third-party products in the future, said David Schwartz, manager of IBM's DataHub development.

DataHub is a database administrator's tool that offers one centralized view of a corporation's database activity from an OS/2 workstation. The product allows easier database management because it masks the different ways in which databases perform management functions, giving administrators a common method for managing different databases, he said.

The product consists of an OS/2 portion and a server portion that work with IBM's DB2 for OS/2 and MVS, as well as with SQL/DS for VM, Schwartz said. Within a year, the company plans to port DataHub to DB2 on AIX as well as to non-IBM databases, such as Oracle Corp.'s, he said.

The AIX version of DB2 will be available in November or December, said Janet Perna, IBM's director of Database Technology in Ontario. Work is already under way for the HP/UX and Windows NT versions of the database, she said, although availability dates have not been announced. The HP/UX version has been easier for her team to develop than the Windows NT version, she explained, because Microsoft's operating system is still being beta-tested.

"HP/UX has been out there; we know how stable it is," Perna said. "NT will have to prove itself as a solid system. It's too early to tell, but if [NT] isn't ready, we'll probably go to another platform and then come back to it. We are working to hit all of [the popular workstation] platforms as quickly as we can."

CLIENT/SERVER PUSH

These and other products fit into IBM's client/server strategy.

The company's Client/Server Computing Unit was formed late last year and was pegged as a strategic group to make IBM successful in the 1990s. The unit is chartered with providing sales, marketing, support and service infrastructures to promote this emerging architecture.

This group also works with other IBM lines of business to ensure that certain product lines implement common client/server technologies, such as multimedia, OS/2's System Object Model and Open Software Foundation, Inc.'s Distributed Computing Environment, said Peter Tarrant, Client/Server marketing director at IBM in White Plains, N.Y.

"My definition of client/server is anyone, anytime, anywhere, any form," said Tom Furey, general manager of the Client/Server Computing unit.

This unit's "vision" of a successful client/server implementation includes users having a single logon to the enterprise, secure entry to the network at all points of contact, a directory to navigate the entire system, interoperability with new technologies and solutions as they emerge, access to global networks and a standard object model across technologies, Furey explained.

IBM is placing a strong emphasis on this technology because of the growing market for client/server products.

IBM's client/server customers will include not only company chief executive officers, chief information officers and end users, but also home users who are already employing a client/server model to do tasks such as accessing the Internet, he said.

IBM is placing a strong emphasis on this technology because of the growing market for client/server products. In 1992, $58 billion was spent on client/server technology, and by 1995, it will grow to be a $100 billion market, Tarrant said. "This is a huge opportunity; we are very interested in getting our fair share of that opportunity," he said.

The Client/Server Computing unit is preparing to help customers achieve this goal through services such as its multivendor Open Service centers. By July, the unit plans to open 60 of these laboratories worldwide that house technologies from dozens of other companies, giving customers a real-world environment for testing and troubleshooting. "We are changing from IBM boxes talking to each other to [being] truly multivendor," Furey said.

"We are changing from IBM boxes talking to each other to [being] truly multivendor."

Other services include doing "parts" for customers, such as integrating a network or installing a complete package of IBM and non-IBM products at a customer site. The unit also boasts between 6,000 and 7,000 engineering and marketing specialists worldwide who are dedicated to working with client/server products. Portions of the company's sales force and outsourcing subsidiary are also targeting customers in need of client/server solutions, he said.

The company's future plans for adding common client/server technologies to multiple product lines include moving its DB2 database and CICS transaction processing software to OS/2 and AIX, as well as to Microsoft's Windows NT and HP's HP/UX, Tarrant explained. "We are taking products that people are familiar with in the mainframe world and moving them to the client/server environment," he said.

In September, the company also plans to release a client/server visual programming tool, he added.

Software AG launches rightsizing program

Firm focuses on needs analysis, planning.

BY BOB BROWN

Reston, Va.

Software AG of North America, Inc. last week outlined a four-part program designed to help users downsize host-based databases and other applications to distributed systems.

Software AG's Strategic Programs for Implementation of Rightsized Information Technology (SPIRIT) initiative is designed to cover initial needs analysis, planning, design and operational support.

The company's goal is to help users increase productivity while reducing costs, said Michele Perry, director of Unix Platform marketing at Software AG, which has evolved its historically host-based product line during the past two years to include a selection of Unix databases and application development tools. The program can entail something as basic as helping a user port an application from one platform to another or even making organizational changes, she said.

The SPIRIT program has four components, two of which are new and two of which are repackaged services.

The new Rightsizing Analysis and Technology Evaluation (RATE) involves analyzing users' existing application and computing infrastructures and formulating a strategic plan to move forward. Questionnaires are used to determine needs, and conclusions are presented in a written report. RATE typically involves interaction with a high-level executive, such as an MIS manager or chief information officer.

Software AG helped one customer, The Chase Manhattan Bank Corp. in Puerto Rico, make a decision about how to best downsize a mainframe application. Initially, the bank was thinking of migrating the application to OS/2 systems, using LU 6.2, but Software AG's analysis persuaded the bank to move to a Unix-based net using Transmission Control Protocol/Internet Protocol, Perry said.

The other new offering under SPIRIT is the chance for users to actually experience migrating applications from one platform to another at the company's Rightsizing Center here. Performing these tests can save money and time associated with doing such experimentation on their own, she explained.

The Rightsizing Center is equipped with products from Software AG as well as its business partners. The company plans to add new systems and software products down the road, Perry added.

Software AG has also packaged under SPIRIT its Rightsizing Applications Methodology Program (RAMP) and Rightsized Environment ACHievement (REACH) programs. RAMP entails Software AG working with a user team to help distribute a single application. REACH involves provisioning turnkey distributed applications.

In a related announcement, the company has signed an agreement with Norwood, Mass., systems integrator Innovative Information Systems, Inc., which has expertise in network planning and design. This complements Software AG's existing expertise in information management consulting and systems analysis and design, Perry said.

Kurt Johnson, senior analyst for software integration services at International Data Corp., a Framingham, Mass., market research firm, said service and support are becoming increasingly important in the database market.

"Too often, these customers are only looking at whether the host software will run on the Unix systems" without looking at all of the network, systems and management ramifications, he said.

☎ Software AG: (703) 860-5050.

Notework

Continued from page 33

Rizzi declined to provide specifics on how the company's product lines will be integrated.

David Ferris, editor of *Ferris E-mail Analyzer* in San Francisco, said the acquisition should bring benefits to existing Notework and ON Technology customers.

"It makes sense to have a level of integration between messaging and calendaring packages, as users want to be able to respond to scheduling requests using E-mail without going to a separate calendaring application," Ferris said.

"It's an attractive option to be able to buy calendaring and E-mail from one vendor, as well," he added.

According to Rizzi, ON Technology plans to make more acquisitions in the future. He added that these will typically be made within the work group software market.

Notework and ON Technology unite

What each company brings to the table

ON Technology, Inc.	Notework Corp.
Primary products:	**Primary products:**
● Meeting Maker group scheduling software for Apple Computer, Inc. Macintosh and Microsoft Corp. Windows PCs.	● Notework Electronic Mail for DOS and Windows PCs
● Other Macintosh products, including Status*Mac software, which is a hardware auditing utility.	● Fax and Telephone Messaging software
	● All software is for Novell, Inc. NetWare environments.

SOURCE: ON TECHNOLOGY, CAMBRIDGE, MASS.
GRAPHIC BY SUSAN SLATER

WHY MEXICO'S BANKS RELY ON GDC.

In the midst of Mexico's dynamic financial world, the Association of Mexican Banks (AMB) serves as a central resource for its 27 members. When the AMB made the strategic decision to establish its own nationwide telecommunications network, RED TEI, it looked to a vendor that could provide a truly world class network: General DataComm.

The AMB had set out strict specifications. It needed a single vendor with a direct presence in Mexico to supply support, spares, maintenance, and applications experience. It needed communications technology that could furnish voice and data according to CCITT standards. It needed 100% compatibility with all the equipment of the different banks, and with TelMex's RDI-64 network. Finally, it needed full redundancy and confidentiality.

The outcome was inevitable.

According to the AMB's technical staff, only GDC could fulfill every single specification.

Today, the AMB's principal network nodes in Mexico City, Monterrey, and Guadalajara, as well as remote nodes in other cities, are equipped with GDC's MEGAMUX TMS transport management system, supported by GDC's MEGAVIEW integrated network management system.

GDC's any-to-any connectivity seamlessly interconnects banks to each other, and to the central Banco de Mexico for funds transfer.

Within each city, banks use the network for clear, confidential voice links and fund transfers. It's a cost-effective solution, too, with multiple voice and data channels carried on a single fractional E1 connection. And real-time, automatic, end-to-end node testing ensures the high security and confidentiality so vital in the financial world.

GDC's modular designs also allow network changes without service interruptions. Interconnection to other financial entities within Mexico, such as brokerage firms, has already been accomplished. Future plans call for connections to insurance companies and to international networks.

General DataComm's world class networks connect businesses and telephone companies in more than 60 countries. To connect with GDC, call +1-203-792-0542. In North America, call toll-free 1-800-777-4005.

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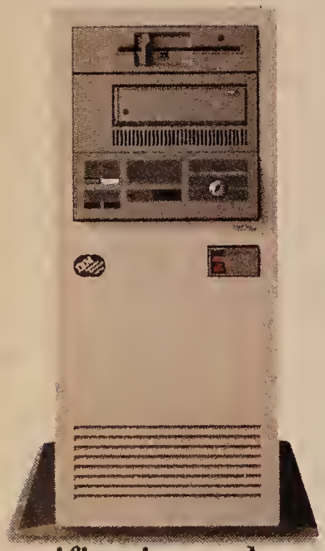

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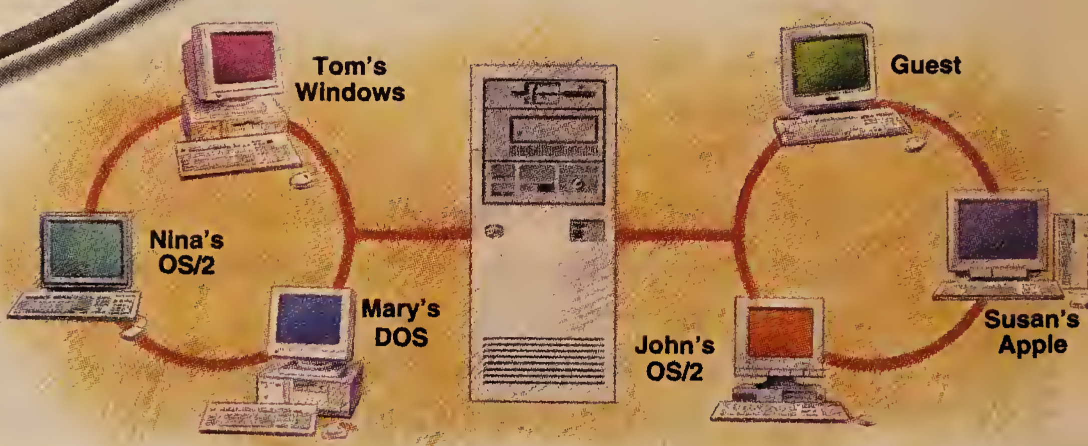

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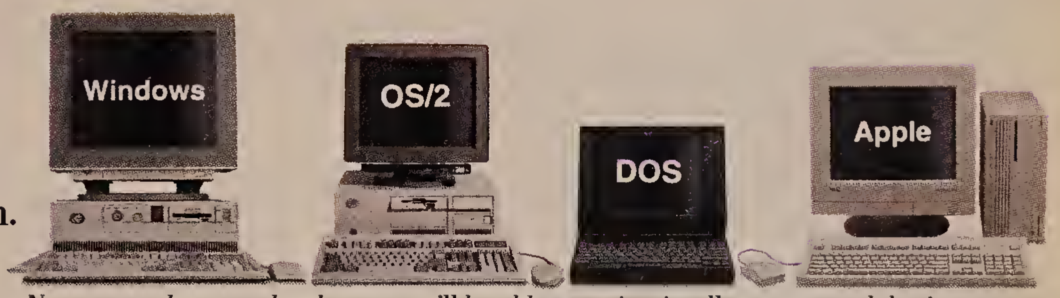

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DOCUMENT EXCHANGE SOFTWARE

Beta users laud Acrobat, await future features

BY JOANNE CUMMINGS

New York

Beta users of Adobe Systems, Inc.'s Acrobat document exchange software are pleased with the initial rendition and are fast putting it to use, although several said they are awaiting features slated for future releases.

Acrobat consists of three software products that let users create electronic documents and send them to other networked users for viewing, printing and annotating. The software permits document sharing even if the recipient is using a different hardware platform, operating system or application software.

According to early users, there are a variety of practical uses for the software, ranging from disseminating meeting notes to easing the exchange of advertising materials between advertisers and newspapers.

Mark Goldenberg, a senior development engineer at Hughes Aircraft Co. in Fullerton, Calif., said his company is using Acrobat to distribute its internal newsletter, as well as to send electronic presentations created using applications such as Microsoft Corp.'s PowerPoint and Aldus Corp.'s Persuasion to attendees prior to meetings.

"We used to have to print out a copy of the presentation, spend hours at the copy machine and then mail copies out to the meeting participants," Goldenberg said. "Now we can just send them out electronically and have the attendees print them out on their end, which saves a lot of aggravation."

Goldenberg also said the firm is looking to use the software to streamline design work. It is currently creating technical specifications on Sun Microsystems, Inc. SPARCstations under Unix that must be printed out to be shared with users that do not have SPARCstations. Using Acrobat, the firm hopes to enable its engineers to share and view the specifications, saving on time and paper.

But Goldenberg said the software should offer better graphics support. "It can only copy graphics and images now," he said. "We'd like to be able to edit them. Also, it would be good if the graphics could be captured in a user-definable way, whether PICT or PostScript or whatever."

Howard Vaughn, prepress project manager at *The Chicago Tribune*, said his firm is only at the evaluation and testing stage with Acrobat, although he is considering several applications.

"As a newspaper, we're looking at it as a type of universal file format for exchanging documents with our advertisers," Vaughn said. "Right now, you can never be sure what fonts they used or what applications they used to create their materials. This way, we can view it and print it the way it was created, even if we don't have the application in-house."

Vaughn also said Acrobat's ability to work across computer platforms is a plus. "Right now, even though we're on the same Ethernet, I can't send a simple letter to my boss over the network," he said, explaining that he works under Windows and his boss works on an Apple Computer, Inc. Macintosh. "Acrobat should help change that."

"It also offers some pretty healthy compression," Vaughn said, "which is necessary when it comes to the sizes of the files we work with." Display ads total several megabytes in size and are saved in PostScript format. To share the ad, it must be converted to an EPS format, which adds several megabytes more to the file.

Dealing with such large files makes "a difficult job more difficult," he said. "Acrobat should cut that down considerably," because files are based on a scaled-down version of PostScript that is then compressed, making them smaller than traditional PostScript files.

Another way the *Tribune* is thinking about using the software is to disseminate sales and marketing presentations to its sales force. "We could issue them portable computers, and they could view and share the presentations with their clients," he said. Currently, the *Tribune* creates the presentations at headquarters, prints them out and sends them to the sales force via express mail, which is costly and time-consuming.

Eventually, Vaughn said, the paper might investigate using the Viewer portion of the software to let subscribers view the newspaper on their computer screens at home. "But that's pretty far down the road," he said. "The paper would need to be completely digitized first, and we're nowhere near that yet."

➨Cummings is a Marlborough, Mass.-based free-lance writer.

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Cincom

Continued from page 33

adds support for multimedia applications via Microsoft Corp.'s Media Control Interface application program interface and Microsoft's Open Database Connectivity specification.

It also runs on three new platforms: IBM's OS/2 2.0, Microsoft's Windows NT and Open Software Foundation, Inc.'s OSF1. Supra Server currently runs on MVS, VAX/VMS and most Unix servers, and supports Windows and DOS clients.

Like two-phase commit, Transaction Partners assigns one node to serve as a transaction coordinator. The coordinator asks all the other nodes participating in a transaction if they are able to perform an update. Once all nodes respond positively, the coordinator gives the go-ahead for the nodes to update their tables (see graphic, page 33).

Transaction Partners differs from two-phase commit in the way nodes recover from failures. In two-phase commit, if one node fails to complete the transaction, then the whole transaction must be rolled back and started again. With Transaction Partners, if one node successfully completes the transaction, then the transaction rolls forward and all nodes must update their tables.

This optimistic two-phase commit is made possible because each Supra Server database or node maintains a log of all other databases participating in a transaction. If a node fails in the middle of a transaction, as part of its reinitialization procedure prior to coming back on-line, it polls participating nodes to see if one successfully completed the transaction. If it finds a node that completed the transaction, it then performs the update. Once the node has processed all outstanding transactions, it becomes available for application processing. This positive approach minimizes the number of transaction restarts required to complete a transaction. This minimizes the number of messages sent across the net and reduces the time database tables are locked, making data more available and improving application performance.

Cincom officials said Transaction Partners works across Supra Server platforms, although most users will likely implement Transaction Partners in homogeneous environments, to start. Z

Help desk

Continued from page 2

workstation: "SHELL-331-76: Network error on server—error receiving from network." This does not happen if I use the older BNET.COM or NETX.COM. What gives?

John Goralczyk, Rockford, Ill.

Ronald Nutter, escalation manager of 900 Support, a 24-hour, seven-day-a-week NetWare technical support company in Lake Oswego, Ore., replies:

It would appear that you have downloaded DOSUP6.ZIP from CompuServe and didn't get the rest of the security enhancements available in the Novfiles area. This error is occurring because none of the other NLMs or utilities are using the NetWare Core Protocol (NCP) packet signature. You may want to download SECDOC.ZIP from the Novfiles area on CompuServe. By default, pburst is using a security signature for the new security enhancements.

For the time being, enter the following statement in the server's autoexec.ncf file after loading pburst: Set NCP packet signature option = 0. This should take care of the message you are seeing. Now you will need to decide whether you want to implement Novell's security enhancements to NetWare 3.11. Z

Distributed databases put on hold by users

Users say they want to integrate their distributed databases, but many users are preoccupied with completing the migration to client/server or downsizing projects.

"Down the road, it could be valuable [to link our databases] because we have some redundancies in our data structures," said Bo Foster, director of management information systems at Alcan Rolled Products Co. in Cleveland. "But right now, it's not high on [the] list." Foster is more concerned with linking a client/server manufacturing application developed using Gupta Corp.'s SQLWindows development tool to Cincom Systems, Inc. Supra Server databases at multiple sites.

Likewise, Doug Grant, manager of product and corporate systems development at British Columbia Automobile Association in Burnaby, British Columbia, is in the midst of downsizing 1,400 applications and 20 databases off a Hitachi, Ltd. mainframe to 12 Sun Microsystem, Inc. Unix servers. When the project is completed in the fall, Grant said his staff will begin testing Cincom's Supra Server 3.0 distributed database capabilities.

Specifically, Version 3.0 promises to provide users with the ability to perform updates across multiple databases without having to log on to each database separately or know the location of remote databases.

Tom McGoldrick, assistant vice president of information services at The Standard Register Co. in Dayton, Ohio, said the key to distributing databases is designing applications so that most of the data they need is local. "There is a strong prerequisite for supporting distributed databases, and that's the network. A 9,600 baud circuit isn't going to cut it anymore," he said.

➨ Wayne Eckerson

New! *The 1993 Groupware Products and Services Catalog!*

Finally, a comprehensive listing of products and services in the commercial groupware market! *The Groupware Products and Services Catalog* will make its debut in August , 1993. Published by the producers of GroupWare '93 and the editors of *GroupTalk* Newsletter, this invaluable tool profiles more than 200 products and services available in the groupware market today. Listings include information on each product's features and functions, as well as information on where to find the product or service you need.

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Editorial

In March, Novell made what it called the most important announcement in its history — the introduction of NetWare 4.0.

But today, Novell is announcing something that may prove more important to the company's future than even the most advanced incarnation of its venerable network operating system (NOS).

In laying out its application development strategy, Novell is, in essence, trying to convince users that NetWare is the place to build the next generation of applications — the core business systems that would have been built on mainframes in years past (*NW*, June 21, page 1).

There's a bunch of other folks trying to do that convincing, as well, including IBM with OS/2, Microsoft with Windows NT and all the Unix vendors.

But Novell is at a disadvantage here: Developing major applications in a NetWare environment is a far cry from developing directly to a 32-bit, multitasking operating system — from both a performance and complexity standpoint. (Just ask users about building NetWare Loadable Modules.)

NetWare is a damn fine file-and-print system and, culminating with NetWare 4.0, it offers an impressive array of network-based services. But NetWare is a fundamentally different animal than Unix, OS/2 and NT. Even Novell sales partner IBM makes that distinction very clearly in positioning NetWare, including 4.0, as a great work group solution but not the platform for your next-generation applications.

Unless Novell delivers equally impressive development services, it faces encroachment on its turf from application servers running NT, et al. That doesn't bode well for the future as these network-ready operating systems add more and more of the services NetWare offers.

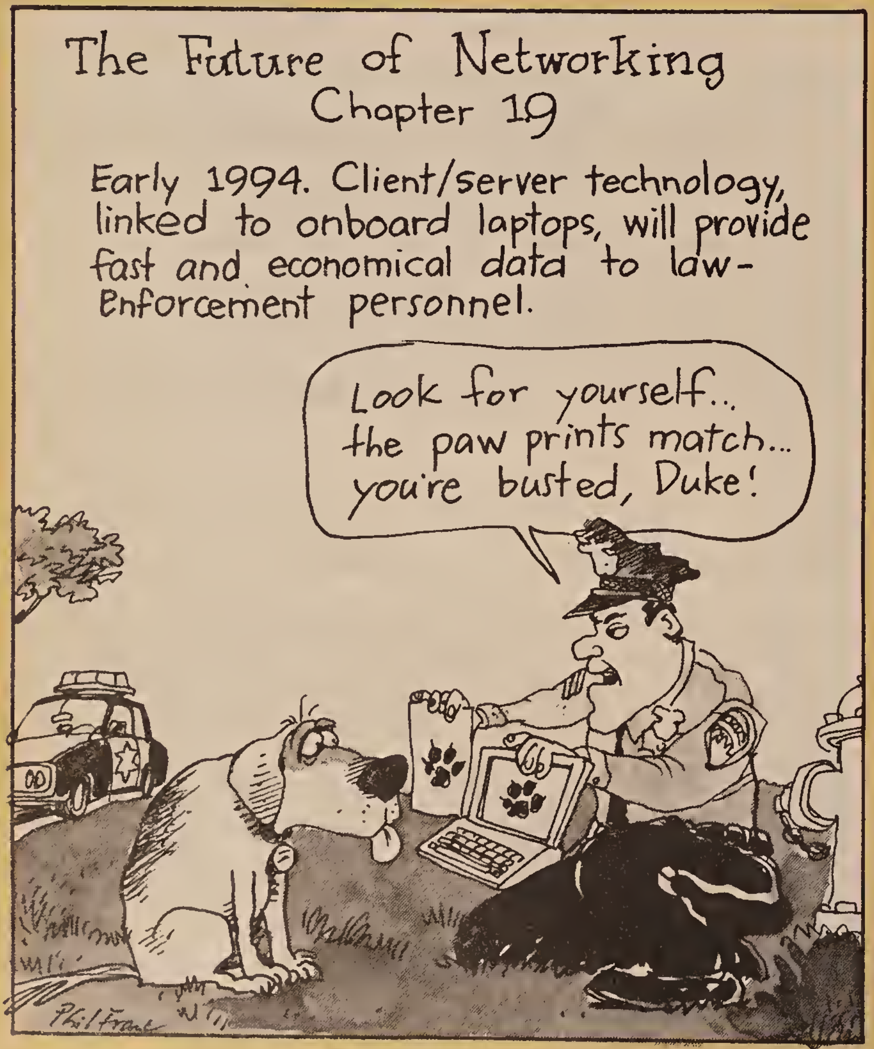
Microsoft clearly has this strategy in mind. Company executives acknowledge that it would be ludicrous to take NetWare on head-to-head in the NOS market today. But once NT gets rooted as an application server, Microsoft knows the tenor of the battle will change dramatically.

Today is an important day indeed for Novell. Without a convincing applications development story, it may wind up sharing control over user networks in the future. That's not necessarily bad, but it isn't quite the same as ruling the roost.

JOHN GALLANT

Teletoons

FRANK AND TROISE


The Future of Networking
Chapter 19
Early 1994. Client/server technology, linked to onboard laptops, will provide fast and economical data to law-enforcement personnel.
Look for yourself... the paw prints match... you're busted, Duke!
Phil Frank

PUBLIC NETWORKING

By Mary Johnston Turner

Intelligent services will help achieve business goals

Although still in their early stages, intelligent virtual network, 800-number and data services are likely to change the way network managers buy and use public services in the near future.

Instead of simply concentrating on network quality and costs, network managers will have to think more broadly about intelligent public services and ask: "How can I use flexible public services to improve customer service? How can I reduce time to market? and How can I offer new types of products and services to my customers?"

Both domestic and international carriers are working to make intelligent public services seamless extensions of enterprise networks.

Voice and data services are being equipped with increasingly sophisticated management tools that help the user not only monitor the network, but also instantly evaluate how well the network is supporting the business and to act on that information immediately.

This means the network can adapt to changing business needs in real time, enabling net managers to work with real-time performance data to order changes in routing, call priority and throughput rates, rather than rely on historical data that may not accurately reflect current circumstances.

One area in which this real-time performance data is particularly important is 800-number services. These services are critical to many businesses such as catalog sales, reservation systems and customer service centers because, for them, lost phone calls mean lost business. In some cases, missing one call could cost a company thousands of dollars in lost revenue.

In the past, customers received historic reports that included information such as how many calls were answered and lost, and when and where network peak hours occurred. While these reports helped users plan for the future, they didn't help them detect and respond to problems as they came up; the business still lost sales because phone calls were being dropped.

Recently, however, a new generation of high-end management services has been adding more real-time monitoring and dynamic configuration control services to the management mix.

Today, AT&T offers its largest 800-number customers management tools that poll telemarketing automatic call distributors, evaluate how well calls are being handled and recommend real-time network changes that might improve the situation. MCI Communications Corp. is developing a similar tool.

AT&T also offers the capability to link customer databases containing information on account status and call-handling priorities to the network. In making an 800-number call-routing decision, the network can actually query the database for advice on how to route the individual call. This is done in real time on a call-by-call basis.

Data services such as frame relay are on the fast track to becoming more flexible and dynamic, as well. During 1993 and 1994, the leading vendors plan to introduce new types of management capabilities that will allow users to request additional bandwidth on demand and change network service levels and user groups at will.

The next step will be to link these control capabilities into user-specific analytic software programs that monitor the ebb and flow of business communications not only within the enterprise, but also between the enterprise and its key customers and suppliers.

Bandwidth, transmission priority and even security authorizations are likely to be changed on the fly by user-specific network management software. Users benefit by paying for network services on a usage basis while having the network finely tuned to their current requirements.

These same tools will make it possible to support new business opportunities, and the corresponding changes in network demand, much more rapidly than in the past.

Historically, only highly specialized private networks such as American Airlines, Inc.'s SABRE and Wal-Mart Stores, Inc.'s RETAILink could be counted on to support new business opportunities. But ongoing improvements enabling network managers to monitor and dynamically control public network services are changing the game.

By utilizing public services, users will increasingly find that they can get much of the flexibility and custom fit they associate with private networks while reducing the need for in-house staff and costly capital equipment investments.

As public services become more dynamic, controllable and adaptable, network managers will become more creative and will seek input from their vendors as to how the increasingly intelligent public network can support business drivers and goals. By leveraging this new set of emerging public network services, leading users can cut their costs and move more quickly into new markets.

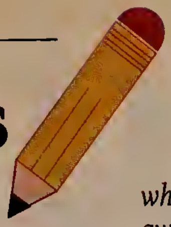
Looking to the future, these same types of dynamic, on-demand intelligent networking tools can be expected to support Asynchronous Transfer Mode and multimedia services, giving them even more potential to fulfill users' business needs.

Turner is a principal with Northeast Consulting Resources, Inc., a Boston-based consulting company working with leading-edge users and vendors of information technology. She can be reached via MCI Mail at 384-0973.

Send us letters!

Have you seen an article in *Network World* with which you strongly disagree or heartily concur? If so, tell us what you think by calling the "Letters to the Editor Hotline" at (800) 622-1108, Ext. 461.

Letters



AT&T takes exception

The first paragraph of your story "Critics hit AT&T on custom network shift" (June 7, page 1) asserts without attribution that "AT&T has quietly begun steering customers away from Tariff 12 packages to contract deals..." Only farther down in the story does the reader learn that the "critics" — and, apparently, the only sources for this story — are two Washington, D.C. attorneys who make their livings negotiating network service contracts with carriers on behalf of their clients.

It seems amazing that these two lawyers carry so much weight with *Network World* that they can call its writers with an unfounded claim and end up on page 1 — under the Reader Advocacy Force logo, no less. It's equally amazing, and disturbing, that *NW* editors would let them get away with it.

The fact is that AT&T has been more active this year with Tariff 12 filings than ever in the five-year history of the offer. We're negotiating more contract tariffs, as well. As was explained to your reporter, AT&T's practice is to "steer" customers to the services best suited to meet their needs. Both contract tariffs and Virtual Telecommunications Network Service (VTNS) are generally available to similarly situated customers.

VTNS is a custom designed, integrated service. VTNS is well suited to large customers with networking, network management, billing and information needs that are complex and sophisticated.

A contract tariff is not a service at all, but a regulatory form that enables AT&T to package and price services from other AT&T tariffs. Contract tariffs may offer services that are simple or complex. Unlike VTNS, the services referred to in a contract tariff may or may not be integrated. Contract tariffs may include price stability; some do.

The many contract tariffs on file should indicate customer satisfaction with these offers, despite the implication in your article to the contrary. Further, the freedom resulting from streamlined regulation of 800 services will now allow for new contracts to satisfy more customer needs.

I'm disappointed that *NW* allowed its pages to be used as leverage by two skillful attorneys in the midst of negotiations with AT&T. Prior to publication, you were cautioned that these sources were hardly objective.

J.R. Swift
Offer management
AT&T
Bridgewater, N.J.

Editor's response: At issue is whether AT&T is really steering users away from Tariff 12 and toward contract deals; and the answer — in some cases involving large users — is certainly yes.

Contrary to AT&T's assertion, we did not rely soley on the opinions of James Blaszak and Hank Levine, the two attorneys quoted. The story quoted one user and was based on information from another who asked not to be named but did back up the thrust of the article. (A fact that should have been noted in the story.)

The second user, now spending tens of millions of dollars annually for network services, was told by AT&T that it would have to wait at least six months for a Tariff 12 but that it could get a contract tariff immediately.

When asked about it, Mr. Swift admitted that AT&T has, on occasion, told users they would have to wait half a year or more for Tariff 12 but that AT&T is prepared to work out contract arrangements much more quickly.

Neither Mr. Blaszak nor Mr. Levine, with years of experience negotiating network contracts for business clients, believes that a Tariff 12 deal needs to take as long as half a year or more.

Mr. Swift also told us Tariff 12 and contract tariffs are so different that they can't be interchanged to satisfy a particular customer's requirements. Mr. Swift said each company's needs qualify it for either a Tariff 12 or a contract tariff. That assertion is logically at odds with the statement that users have been told they can "wait" for Tariff 12 or get contracts right away.

As for the objectivity of Mr. Blaszak and Mr. Levine, both have proven to be insightful sources who have represented users for years. These lawyers have negotiated dozens of Tariff 12 and contract deals for their clients and have a broader perspective on this issue than any customer.

Mr. Levine notes that an assertion in Mr. Swift's letter requires clarification. Mr. Swift asserts that contract tariffs are "not a service at all, but a regulatory form that enables AT&T to package and price services from other AT&T tariffs."

But according to the Federal Communications Commission's order "Competition in the Interstate Interexchange Marketplace," which gave AT&T the freedom to enter into contract tariffs, "One important benefit of contract carriage is that it will increase the ability of customers to negotiate service arrangements that best address their particular needs." The decision was made to extend the benefits of Tariff 12 to contract tariffs.

Mr. Levine said that while AT&T has indeed negotiated some customized terms and conditions into contract tariffs, it routinely tells prospective customers, particularly those without prior experience in negotiated arrangements, that it doesn't negotiate special terms and won't, attributing reluctance to unspecified "regulatory" factors.

Although Mr. Swift said AT&T has been "more active with Tariff 12 filings than ever in the five-year history of the offer," Mr. Levine claims that this activity almost exclusively involves refiles at the FCC that amend or extend existing deals.

Up to Jan. 1, AT&T had filed 119 Tariff 12 options and about 60 contract tariffs. Since then, it has filed about a dozen new Tariff 12s and over 100 contract tariffs.

Inverse mux issues

I congratulate you on the effort and focus given to inverse multiplexing in your recent Buyer's Guide (May 17, page 41). I believe *Network World* is the first prominent book to examine the early trends associated with network access.

But I would like to address some oversights in your article regarding Newbridge Networks, Inc.'s Transmission Access Processor (TAP) product line. TAP supports both Integrated Services Digital Network multirate and Globand service; supports simultaneous connection from different carriers; simultaneously supports ISDN Primary Rate Interface (PRI) and Baic Rate Interface (BRI); and has supported switching from its first announcement.

Moreover, the major disappointment was that the article did not really focus on changes in network access. This, to a degree, may have been due to concentrating on suppliers of inverse multiplexing technology, such as Ascend Communications, Inc. and Teleos Communications, Inc.

The real issue is not inverse multiplexing but network access driven by applications. Users are realizing the economic benefits of choosing different network services for each application. They also realize that this can be achieved from multiple carriers. This situation demands a different view of access, moving away from the more traditional view given by suppliers of sole inverse multiplexers. Moreover, it is not far away and demands more attention.

Bert Whyte
Vice president and general manager
MainStreet Access Products
Newbridge Networks, Inc.
Ontario

Editor's response: While the Buyer's Guide focused on inverse multiplexers, we did mention recent changes in these products that broaden their functionality.

In fact, Ascend and Teleos would be the first to agree that inverse multiplexing is only a single feature of their products.

We intend to continue covering the evolution of such devices into network access products.

As for the oversights of the Newbridge product's capabilities, we acknowledge that the article did not mention that TAP supports ISDN multirate, as well as the ability to simultaneously support ISDN PRI and BRI circuits. However, we did note TAP's switching capability in the Buyer's Guide chart.

In addition to surveying each vendor for basic capabilities listed in the chart, the authors attempted to interview each vendor. Newbridge did not take advantage of this opportunity, which resulted in the omission of information. Newbridge did fill out the survey.

A pat on the back

I follow *Network World* weekly and find that your articles have been timely and very helpful in my role as a network manager.

I am responsible for extensive local- and metropolitan-area networks, as well as national and international data communications services. We have maintained reliable host and distributed system connectivity for more than 25,000 customers using cost-effective multivendor, multiprotocol, multitransport media solutions.

I have found your publication to be superior to all others for keeping pace with what is happening in the marketplace. I appreciate the value of your publication to our employees and wanted you to be aware that I look forward to reading each issue.

L.G. Dapra
Staff specialist, computer services
Computer Sciences Corp.
Fort Worth, Texas

Making a federal case

In their opinion column titled "Company E-mail policies crucial for proper usage" (June 7, page 36), Richard Raysman and Jeffrey Neuburger state, "Under the laws of some states, employees have a right of privacy in their E-mail messages, unless they waive this right."

However, the Electronic Communications Privacy Act of 1986, in part, states, "A governmental entity...may include in its subpoena or court order a requirement that the service provider to whom the request is directed create a backup copy of the contents of the electronic communications sought in order to preserve those communications."

It would seem that the federal law would take precedence over any state law regarding privacy.

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SERVERS

Buyer's guide

Servers push the envelope

BY MIKE HURWICZ

Issues such as bus design, processing architecture and fault tolerance make superserver selection a tricky proposition.

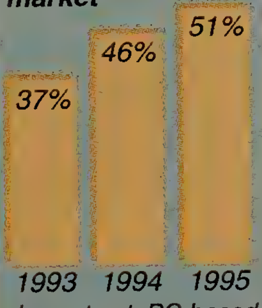
More and more, network managers are putting all of their eggs in one basket.

They're turning to so-called superservers — defined here as multiprocessor local-area network servers based on non-Reduced Instruction Set Computing (RISC) Intel Corp. processors — to replace multiple personal computer-based LAN servers, although high-end PC-based servers still play an important role. Net managers are also turning to superservers in increasing numbers to anchor applications formerly found on mainframe and host systems, particularly database management systems.

But when all of the eggs are in one basket, it had better hold.

"Our single Tricord [Systems, Inc.] server is holding approximately $2.5 billion worth of airline tickets," says Keith Venzke, manager of the Sato Settlement Plan administration for SatoTravel of Arlington, Va. The firm uses a Tricord PowerFrame Model 40 to handle this mission-critical application. "Every sale and every refund done by this corporation in the last two years is on-line from 950 sales offices and over 2,000 employees."

Expected growth of the superserver market



In contrast, PC-based server sales are expected to nearly double each year for the next 3 years.

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

Superserver vendors have come a long way in meeting the needs of net managers in Venzke's position. At the heart of a superserver is an architecture that supports more than one processor — in some cases 10 or more — and advanced bus designs that result in systems that prevent such performance problems as I/O bottlenecks.

Beyond that, most superserver vendors have anted up with the kinds of fault tolerance features net managers require for their core business applications. They've also begun offering advanced management features that simplify the job of server performance monitoring and are moving toward on-the-fly configuration, although support for the Simple Network Management Protocol is not yet ubiquitous.

With the advent of powerful processors such as the 486 and the Pentium chip, even single-processor PCs have begun to take on larger mission-critical jobs. A select group of PC-based servers that offer features associated with superservers, such as fault tolerance, manageability, and large amounts of random-access memory and storage, have also been included in this Buyer's Guide.

A third emerging option for high-end LAN servers is the RISC platform. With commitments by several RISC server vendors to port network operating systems (NOS) — especially Novell, Inc.'s NetWare — to their RISC platforms, users would do well to scrutinize this option. However, today's RISC systems, while well suited to the compute-intensive Unix environment, typically overemphasize processing power and underemphasize I/O in regard to the needs of LAN server applications (see story, page 51).

Customers interested in systems in the high end of this market should look to the multiprocessing superservers. Users can often purchase these systems with a mix of processor types and upgrade the systems by swapping in higher performing modular processor boards. Superservers frequently employ advanced, proprietary bus designs — although many also include a standard bus to enable use of standard LAN adapter cards.

The systems support large amounts of RAM — up to 1G byte in some cases — and large amounts of storage — from 10G to 500G bytes. Extensive Redundant Array of Inexpensive Disks (RAID) support is often provided, as are Small Computer System Interfaces and a range of fault tolerance features and server management options. Dual-processor systems might fetch a price of $5,000. Top-of-the-line 10-processor superservers can start in the neighborhood of $50,000 and range in price up to $700,000 for fully configured systems (see High-end LAN servers chart, page 44).

The low end of this market is populated with fewer than 10 single-processor PC-based systems. These generally support a large amount of RAM, from 64M to 144M bytes, and storage, from 10G to 58G bytes. While RAID support is often available, low-end systems tend to offer fewer fault tolerance and management features.

Making a purchase in either segment of this market is not necessarily a daunting task. Customers should keep a list of key criteria in mind that would include the following: performance — based on processing power and bus architecture; support and optimization for the right software — from operating systems to NOSes to applications; fault tolerance and management.

The Short List

Superservers:

- ✓ IBM Personal Computer Co.'s IBM PS/2 Server 295
- ✓ NetFRAME Systems, Inc.'s NF450FT
- ✓ Tricord Systems, Inc.'s PowerFrame ES5000

Single-processor server:

- ✓ Compaq Computer Corp.'s ProSignia

Complete details about The Short List appear on page 48.

One bump in the road, however, is measuring system performance. While some standard benchmarks are available, vendors generally do not consistently provide performance results, leaving customers with the job of weighing several interrelated factors.

UNDER THE HOOD

While suitable performance data has long been readily available in the RISC workstation and minicomputer arenas, it has been noticeably absent from the LAN server market. Assessing the performance of high-end Intel-based LAN servers is no easy task. But performance is usually a function of two main system components: the processor configuration and the bus design.

Systems covered in this Buyer's Guide use non-RISC processors supplied by Intel, from the new Pentium — the 486 follow-on — down to the 386. Many of the high-end servers include additional non-Intel processors for tasks such as I/O. For instance, The Network Connection, Inc. Triumph M2 SMP/486 provides a maximum of 10 33-MHz to 66-MHz 486 processors used for general-purpose tasks. The system also allows up to two Motorola, Inc. 68030 processors devoted to I/O, although the system maximum is 10.

While the number and type of processors are a key factor, a closely related issue is symmetric multiprocessing (SMP), a method used to share work among several processors in a single system. With SMP, any processor can take on any task, such as application processing, NOS operations, disk I/O tasks and network I/O traffic. Furthermore, processors cooperate on tasks in a dynamic fashion. When one processor completes a job, it can jump in and pick up a portion of a job that another processor is still working on. Thus, SMP allows for efficient use of processing cycles.

Every multiprocessing superserver listed in the accompanying chart supports SMP, with the exception of servers from NetFRAME Systems, Inc. SMP machines include the Advanced Logic Research, Inc. (ALR) ALR Proveisa, the Compaq Computer Corp. SystemPro/XL and the Hewlett-Packard Co. NetServer LM, which all support two Intel processors in SMP mode. Acer America Corp.'s AcerFrame 3000mp supports a maximum of four processors in SMP mode, and AST Research, Inc.'s Manhattan SMP supports up to five processors in SMP mode.

For a complete list of SMP support, see the chart on page 44.

SYMMETRIC MULTIPROCESSING

A key consideration when purchasing multiprocessing servers is whether the software the customer plans to run supports SMP. NOSes that run in native mode — meaning they completely govern the machine — must support SMP to take advantage of more than one processor. NetWare does not support SMP, while one version of Banyan Systems, Inc.'s VINES does.

Because Microsoft Corp.'s LAN Manager and IBM's LAN Server run as OS/2 applications and not as native operating systems, their ability to take advantage of SMP depends on OS/2's SMP support. Off-the-shelf versions of OS/2 currently do not support SMP, although IBM Personal Computer Co.'s PS/2 Server 295 and 195 use OS/2 extensions that provide SMP support. Microsoft's Windows NT and Windows

Continued on page 48

High-end LAN servers

Company	Product	Operating system support	NOS support	Processors 3 = 386 4 = 486 P = Pentium O = Other					Memory		Buses E = EISA L = Local bus M = MCA O = Other		Storage		SCSI 1 = SCSI 1 2 = SCSI 2	Management		Fault tolerance						Base price/Warranty (months)	Standard configuration/Price
		D = DOS O = OS/2 U = Unix	L = LAN Manager N = NetWare S = LAN Server V = VINES	Max. no.	Type/Max. no./Speed (MHz)	SMP	Use: A = Application C = CPU G = General I = I/O	Max. cache per processor (K bytes)	Max. RAM (M bytes)	ECC	Type/No. slots	Throughput: Peak/Sustainable (M byte/sec)	Max. storage: E = External I = Internal T = Total (G bytes)	RAID support (1)	Type/Max. no. channels	A = Add-in card B = Built-In S = Software-based	A = SNMP agent C = Custom MIB	Hot-swappable external disk	Hot-swappable internal disk	A = Automatic recovery from memory fault D = Disk mirroring	UPS	Bus parity checking	Memory parity checking		RAM (M bytes)/Storage (bytes)/No. processors 4 = Includes NOS
Acer America Corp. (800) 733-2237	AcerFrame 3000mp	D, O, U	N, V	4	4/4/50	4		256	256 (2)	4	E/10	33/33	I: 11 T: 11	1, 4, 5						A			4	$11,995/12	16/0/1; $11,995
					P/4/66	4		256			O/6	264/120													
	AcerFrame 500	D, O, U	N, V	1	4/1/33-66		G	256	64		E/7	33/33	I: 10 T: 10										4	$2,095/12	4/0/1; $2,095
											L/1	132/44													
Advanced Logic Research, Inc. (800) 444-4257	ALR Proveisa	D, O, U	L, N, S, V	2	4/2/33-66	4		512	256		E/10	33/23	I: 13.2 T: 13.2	0, 1, 4, 5		B, S			4	D			4	$2,495/15	8/340M/1; $4,595
					P/1/60-66	4		512																	
	Evolution VQ	D, O, U	L, N, S, V	1	P/1/60-66		G	512	1,000		E/10	33/23	I: 13.2 T: 13.2	0, 1, 4, 5		B, S			4	D			4	$4,495/15	16/480M/1; $5,995
AST Research, Inc. (800) 876-4278	Manhattan SMP	D, O, U	L, N	5	4/5/50	4		256	448	4	E/8	33 (3)	E: 32 I: 16 T: 32	0, 1, 5	2/10	A, S		4	4	A, D		4	4	$26,995/36	16/1G/1; $26,995
											O/8	200 (3)													
	Premium SE 4/66	D, O, U	L, N, S, V	1	4/1/66		G	256	128		E/8	33/11	E: 32 I: 8 T: 32	1, 5	2/8			4	4	A, D			4	$4,795/36	16/500M/1; $6,985 (4)
	Premium SE 4/33	D, O, U	L, N, S, V	1	4/1/33		G	8	80		E/9	33/11	E: 32 I: 8 T: 32	1, 5	2/8			4	4	A, D			4	$3,295/36	8/500M/1; $5,485 (4)
Compaq Computer Corp. (800) 345-1518	ProSignia	D, O, U	L, N, S, V	1	4/1/33-66		G	256	144		E/7	33/33	E: 58.8 I: 7.35 T: 58.8	1, 4, 5	2/8	A, B, S	A, C	4		A, D			4	$4,449/(3)	8/550M/1; $4,799 (5)
					P/1/60-66		G	256			O/0	267/267													
											O/0	267/267													
	SystemPro/XL	D, O, U	L, N, S, V	2	4/2/50-66	4		256	512	4	E/7	33/33	E: 58.8 I: 8.4 T: 58.8	1, 4, 5	2/8	A, B, S	A, C	4		A, D			4	$13,999/(3)	16/1.05G/1; $14,769 (5)
					P/2/60-66	4		256			O/0	267/267													
											O/0	267/267													
Cubix Corp. (800) 829-0554	EISA Server	D, O, U	L, N, S, V	1	4/1/66		G	128	64		E/15	33/3	E: 50.4 I: 4.8 T: 50.4		2/6	B, S							4	$4,450/12	4/0/1; $4,850
Dell Computer Corp. (800) 289-3355	4000/XE	D, O, U	L, N, S, V	1	4/1/33-66		G	256	128		E/8	33/25	E: 56 I: 8 T: 56	1, 4, 5	1/4, 2/8	S	A			D			4	$4,349/12	8/320M/1; $4,349
Hewlett-Packard Co. (800) 333-1917	NetServer LM	D, O	L, N, S, V	2	4/1/33-66	4		128	128		E/8	66/40	E: 28 I: 7 T: 35	0, 1, 5, 6		S	A	4	4	D			4	$4,449/36	16/1G/1; $6,049
					P/2/66		G	256																	
IBM Personal Computer Co. (800) 772-2227	IBM PS/2 Server 295	O	L, N, S	6	4/2/33-50	4	A, I	128-256	128	4	M/8	20/20	E: 28 I: 9 T: 28	5	1/4, 2/4	A, B, S	A, C	4	4	A, D	4	4	4	$29,060/36	32/6G/2; $53,000
					O/4/50		I				M/4	20/20													
											O/6	200/200													
	IBM PS/2 Server 195	O	L, N, S	5	4/1/33-50	4	A, I	128-256	128	4	M/8	20/20	E: 28 I: 9 T: 28	5	1/4, 2/4	A, B, S	A, C	4	4	A, D	4	4	4	$19,995/36	32/3G/1; $35,000
											O/6	200/200													
NetFRAME Systems, Inc. (800) 852-3726	NF450FT	O, U	L, N	9	3/8/25		I	1,000	128	4	O/8	700/350	E: 72.8 I: 16.8 T: 89.6	0, 1	2/8	B, S		4	4	A, D	4	4	4	$69,950/12	32/1.1G/6; $69,950
					4/4/50-66		A	256																	
					P/4/66		A	256																	
					4/1/25-50		C	256																	
					3/1/25-50		C	256																	
	NF250FT	O, U	L, N	4	3/3/25		I	1,000	128	4	O/8	700/350	E: 33.6 I: 8.4 T: 33.6	0, 1	2/8	B, S		4	4	A, D	4	4	4	$29,950/12	8/1.1G/6; $29,950
					4/4/50		A	256																	
					P/4/66		A	256																	
					4/1/25-50		C	128																	
					3/1/25-50		C	128																	
The Network Connection, Inc. (800) 327-4853	Triumph M2 SMP/486	D, O, U	L, N, S, V	10	4/10/33-66	4	A	1,000	256		E/13	33/33	E: 12 I: 36 T: 48	5		A, B, S		4	4	A, D	4	4	4	$42,470/12	64/1G/1; $49,865 4
					O/1/30		I				O/13	64/64													
	Triumph M2 Trac	D, O, U	L, N, S, V	2	4/1/33-66		A	256	256		E/13	33/33	E: 12 I: 36 T: 48	5		A, B, S		4	4	A, D	4	4	4	$16,870/12	32/4G/2; $22,593 4
					O/1/30		I				O/13	64/64													

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Introducing the new HP

We're introducing more than just two new servers. We're introducing a profound improvement in the way you monitor and manage your servers.

Continuous Assistance.
We've put server management right where it belongs. At your fingertips. The HP NetServer Assistant software lets you easily monitor and manage your network servers from a single console–either locally or remotely. So your server stays up and running. Not you.

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Investment Protection.
With technology changing faster than the weather, you'll be happy to know that HP's NetServers are designed to keep pace. And keep your investment protected. Both the LE and LM fit smoothly into multi-vendor environments. The LE is the ideal entry-level server. Upgradable to the future Intel OverDrive Pentium™ technology-based processor, it provides affordability, exceptional serviceability and future scalability.

Built to meet the full demands of the Pentium processor, the LM will also support dual symmetric multiprocessing. Its Power Cabinet allows room for expansion with nine front-accessible mass storage shelves, eight expansion slots and maximum memory capacity of 384 MB.

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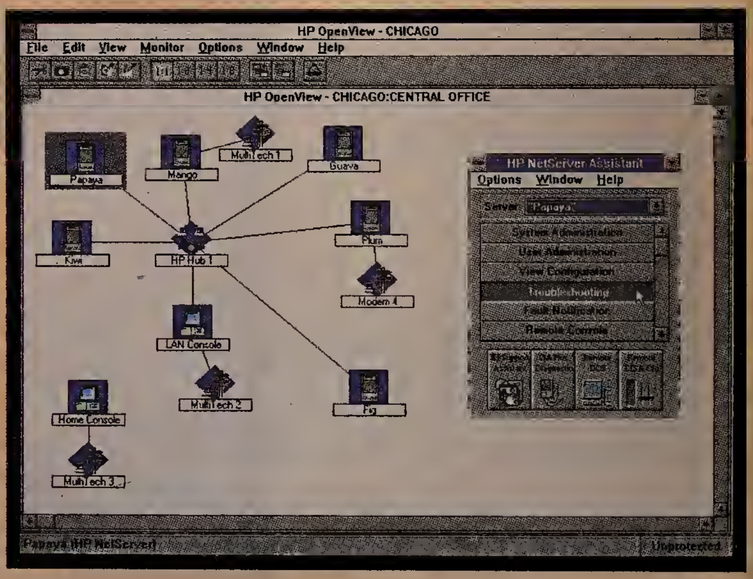
All this is backed by HP's complete range of support services. And by HP's 20+ years of network



HP NetServer Assistant

HP NetServer LM

NetServer LM and LE.

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HP NetServer LM

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- 60-MHz Intel Pentium™ processor, 33-MHz Intel 486 DX and 66-MHz Intel 486 DX2 processors
- Support for dual Pentium symmetric multiprocessing
- High fault tolerance with internal RAID disk array option (RAID 0, 1, 5, 6)
- 16-MB standard RAM, 384-MB maximum memory, ECC memory support
- 128-KB and 256-KB external cache
- 9 mass storage shelves, 3.5″ floppy disk drive standard, maximum 8-GB internal storage
- 8 EISA-2 with Enhanced Master Burst bus-master I/O slots
- Integrated Fast SCSI-2, IDE and video controllers
- HP NetServer Assistant software included
- 3-year on-site, next-business-day limited warranty
- Tested and certified on major network operating systems

HP NetServer LE

$2,649**

- 33-MHz Intel 486 SX, 33-MHz Intel 486 DX and 66-MHz Intel 486 DX2 processors
- Upgradable to Intel OverDrive Pentium technology-based processor when available
- 4-MB and 8-MB standard RAM, 128-MB maximum memory
- 256-KB external cache
- 4 mass storage shelves, 3.5″ floppy disk drive standard, maximum 3-GB internal storage
- 5 EISA bus-master I/O slots
- Integrated Fast SCSI-2, IDE and video controllers
- HP NetServer Assistant software available as an option
- 3-year on-site, next-business-day limited warranty
- Tested and certified on major network operating systems

HP NetServer Assistant

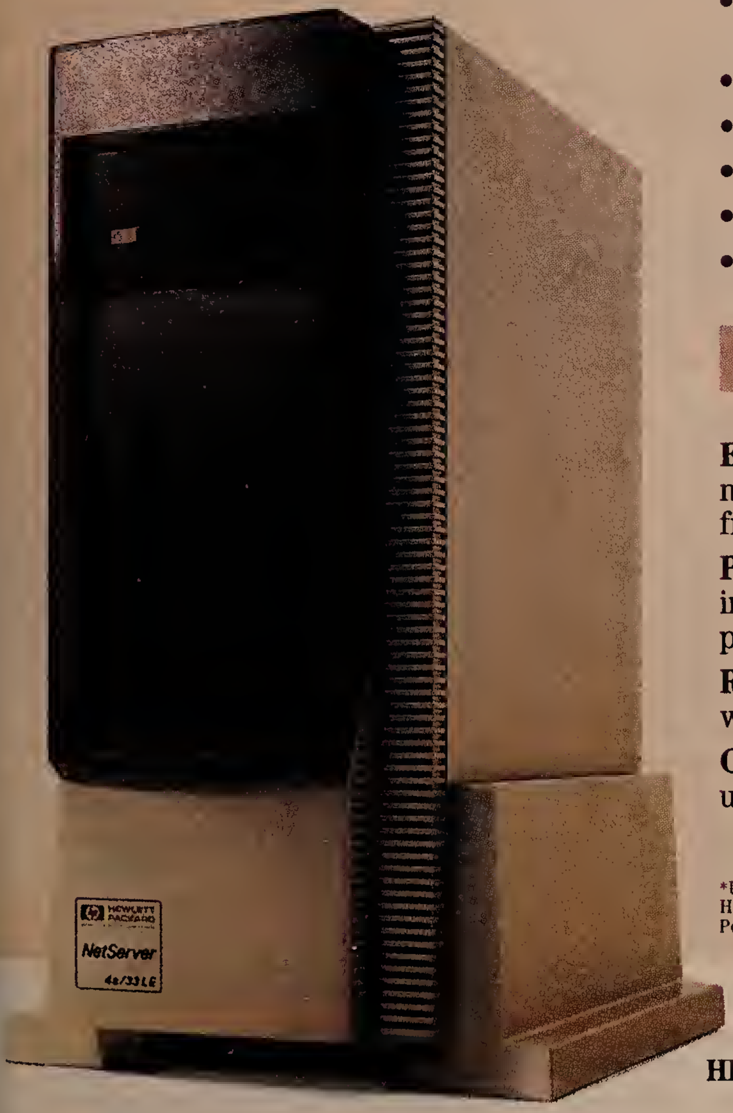
Easy-to-use centralized management based on HP OpenView's leading network management environment allowing multiple servers in multiple sites to be managed from a single graphical map.

Problem identification and resolution tools including diagnostics, configuration information (whether the network operating system is up or down), disk capacity planning and technical information via a CD-ROM-based library.

Remote management capabilities allow administrators to use the same tools whether at their local console or a remote PC.

Open architecture facilitates adding specialized third-party or HP management utilities.

*U.S. list price for HP NetServer LM Model 530, including 486/33DX processor, 16-MB RAM and 535-MB SCSI hard drive. **U.S. list price for HP NetServer LE Model 240, including 486/33SX processor, 4-MB RAM and 240-MB IDE hard drive. Prices subject to change without notice. Pentium and the Intel Inside logo are U.S. trademarks of Intel Corporation. ©1993 Hewlett-Packard Company PPG686



HP NetServer LE

HEWLETT PACKARD

High-end LAN servers

Company	Product	Operating system support	NOS support	Processors 3 = 386 4 = 486 P = Pentium O = Other					Memory		Buses E = EISA L = Local bus M = MCA O = Other		Storage		SCSI 1 = SCSI 1 2 = SCSI 2	Manage-ment		Fault tolerance						Base price/ Warranty (months)	Standard configu-ration/Price
		D = DOS O = OS/2 U = Unix	L = LAN Manager N = NetWare S = LAN Server V = VINES	Max. no.	Type/ Max. no./ Speed (MHz)	SMP	Use: A = Application C = CPU G = General I = I/O	Max. cache per processor (K bytes)	Max. RAM (M bytes)	ECC	Type/ No. slots	Throughput: Peak/Sustainable (M byte/sec)	Max. storage: E = External I = Internal T = Total (G bytes)	RAID support (1)	Type/ Max. no. channels	A = Add-in card B = Built-in S = Software-based	A = SNMP agent C = Custom MIB	Hot-swappable external disk	Hot-swappable internal disk	A = Automatic recovery from memory fault D = Disk mirroring	UPS	Bus parity checking	Memory parity checking		RAM (M bytes)/ Storage (bytes)/No. processors 4 = Includes NOS
Tricord Systems, Inc. (612) 557-9005	PowerFrame ES5000	D, O, U	L, N, S, V	12	P/6/66	4	A	256	1024	4	E/9	33/25	I: 506 T: 506	1, 2, 4, 5	2/24	B, S	C	4	4	A, D	4	4	4	$78,200/36	64/525M/2; $78,200
					4/6/66	4	A	256			O/10	267/267													
					3/6/33		I																		
	PowerFrame Model 30	D, O, U	L, N, S, V	4	4/2/25-66	4	A	256	32	4	E/8	33/25	E: 84 I: 18 T:84	1, 3, 5	2/4	B, S	C			D	4	4	4	$16,400/36	16/425M/2; $16,400
				4	3/2/33		I				O/5	132/132													
	PowerFrame Model 40	D, O, U	L, N, S, V	4	4/2/25-66	4	A	256	32	4	E/8	33/25	E: 84 I: 33 T: 84	1, 3, 5	2/4	B, S	C			D	4	4	4	$29,990/36	32/425M/2; $29,990
				4	3/2/33		I				O/5	132/132													
Unisys Corp. (215) 986-9011	U 6000/65	D, U	N	5	4/5/33-50	4		1,000	256	4	E/8	33/ (3)	E: 44.5 I: 4.5 T: 44.5	0, 1, 10			A				4	4	4	$24,000/12	64/1.7G/2; $57,700
											O/5	100/ (3)													

Products highlighted by color were selected for the Short List.

FOOTNOTES:

(1) RAID has seven versions: RAID 0, RAID 1, RAID 2, RAID 3, RAID 4, RAID 5 and RAID 10.

(2) 128 with 4 processors.

(3) Vendor declined to provide information.

(4) Price does not include disks.

(5) Compaq would only provide estimated prices.

ECC= Error correcting code
EISA = Extended Industry Standard Architecture
MCA = Micro Channel Architecture
MIB = Management Information Base
NOS = Network operating system
RAID = Redundant Array of Inexpensive Disks
SCSI = Small Computer System Interfaces
SMP = Symmetric multiprocessing
UPS = Uninterruptible power supply

SOURCE: MIKE HURWICZ, EASTSOUND, WASH.

Continued from page 43

NT Advanced Server will support SMP when they ship in the near future.

While it is technically possible to run NetWare on an SMP machine, it would not be able to take advantage of the other processors. In fact, any processor beyond the single processor running the NOS would be completely idle. Thus, customers interested in running NetWare — or any other software that does not support SMP — should look at servers that support asymmetric multiprocessing.

In asymmetric multiprocessing, each processor is assigned a specific task and performs only that task. For instance, one processor might be dedicated to network I/O, while another handles the NOS. Yet another processor might be assigned to run a DBMS. All tasks are likely to run faster when each task has a processor all to itself. On the other hand, because the processing load is not equally distributed among processors, some processors may loaf while others are pushed to their limits. Generally speaking, asymmetric systems run any software that has been designed to run on that particular processor and operating system.

NetFRAME is the only superserver vendor whose systems all operate solely in asymmetric mode, although several other vendors also provide asymmetric server models. A single-system processor can be dedicated to running the NOS, usually NetWare. Another processor could be devoted to running another NOS, either NetWare or LAN Manager. The application processors can each run an application, or each processor could support its own operating system, such as Unix and OS/2. Each NetFRAME network I/O module has its own processor.

Multiprocessor systems supporting only

Continued on page 50

The Short List:

High-end LAN Servers

The Short List highlights products Network World *recommends you examine during the purchasing process for high-end local-area network servers. Products on the list were selected based on their design, scalability, reliability and management features.*

SUPERSERVERS

■**IBM Personal Computer Co. IBM PS/2 Server 295.** No other superserver comes close to this machine's support for OS/2 and OS/2 applications. The server supports as many as six processors, fewer than larger superservers, which offer a maximum of 12.

It supports symmetric multiprocessing (SMP) and comes with three independent buses that provide a balance between processing power and I/O. One bus is proprietary and operates at a peak throughput of 200M byte/sec, which is slower than the other superservers selected for The Short List. Up to 128M bytes of error correcting code memory and up to 28G bytes of storage are supported. Redundant Array of Inexpensive Disks (RAID) support is somewhat limited, with only RAID Level 5 offered.

Also, the system has hot-swappable external and internal disks. And it recovers automatically from memory faults and performs parity checking on the bus and on memory. An independent battery-operated management processor module provides an extra level of fault tolerance.

■**NetFRAME Systems, Inc. NF450FT.** The NF450FT enables users to add more bus capacity with each I/O processor module, providing an especially well-balanced architecture. The system is optimized for Novell, Inc. NetWare and provides network and disk drivers optimized for a NetWare environment. A maximum of nine processors are supported, although SMP is not. However, NetWare does not support SMP.

A maximum of 128M bytes of ECC memory and up to 89.6G bytes of storage are supported. RAID support is limited to RAID Levels 0 and 1. A battery-operated management processor provides management fault tolerance. Hot-swappable internal and external disks, automatic recovery from memory faults and parity checking on buses and memory are supported.

■**Tricord, Systems, Inc. PowerFrame ES5000.** PowerFrame ES5000 supports as many as 12 processors and up to 506G bytes of storage, more than five times the storage of any other system. Support for both SMP and asymmetric multiprocessing enables the system to be configured for a wide range of software. For instance, the system can be optimized to run NetWare — which does not support SMP — and VINES SMP, which does. The system also supports up to 1,024G bytes of ECC memory, more than any other server. There are two independent buses, one of which is high-speed, running at a peak throughput of 267M byte/sec. Four levels of RAID are supported. A battery-operated management module, hot-swappable external and internal disks, automatic recovery from memory faults, and parity checking on buses and memory are supported.

SINGLE-PROCESSOR SERVER

■**Compaq Computer Corp. ProSignia.** The ProSignia's three-bus Tri-Flex architecture, which features two buses — one running at 267M byte/sec and the other at 33M byte/sec — increases system performance. Insight Manager, a software and hardware management system, provides detailed remote server monitoring. ProSignia offers up to 144M bytes of non-ECC random-access memory. Up to 58.8G bytes of storage is possible, more than on any other personal computer-based server. Three RAID levels are supported. Hot-swappable external (but not internal) disks, automatic recovery from memory faults, parity checking on memory (but not on the buses) are supported.

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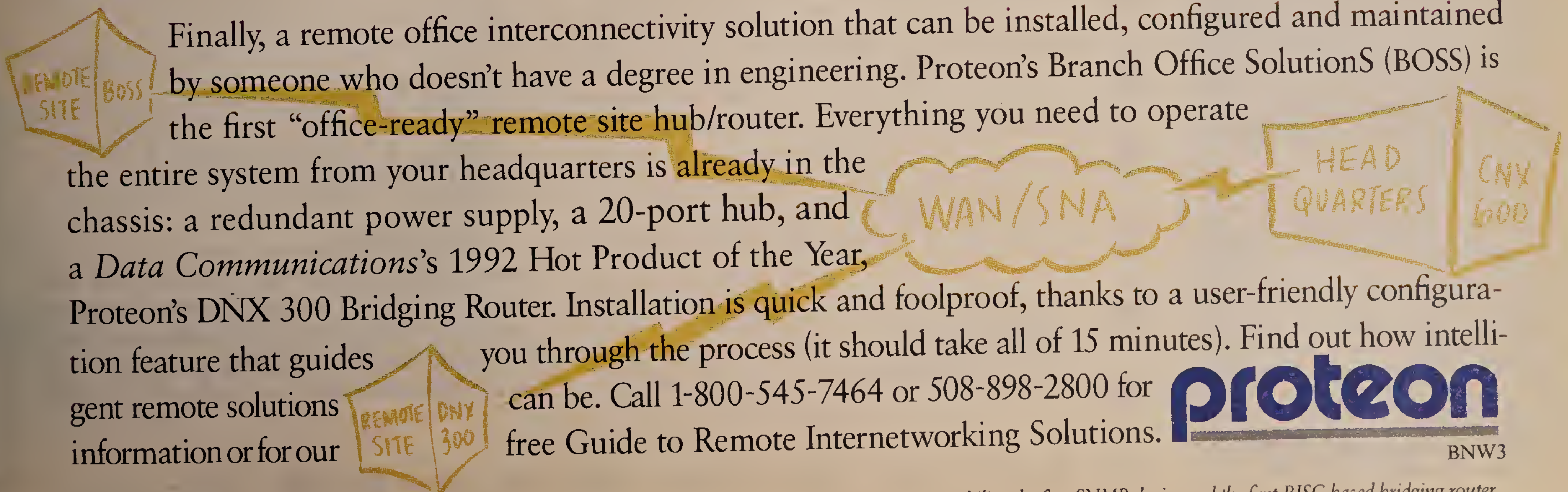
A remote interconnectivity solution so smart, it even tells you how to hook itself up.



Finally, a remote office interconnectivity solution that can be installed, configured and maintained by someone who doesn't have a degree in engineering. Proteon's Branch Office SolutionS (BOSS) is the first "office-ready" remote site hub/router. Everything you need to operate the entire system from your headquarters is already in the chassis: a redundant power supply, a 20-port hub, and a *Data Communications*'s 1992 Hot Product of the Year, Proteon's DNX 300 Bridging Router. Installation is quick and foolproof, thanks to a user-friendly configuration feature that guides you through the process (it should take all of 15 minutes). Find out how intelligent remote solutions can be. Call 1-800-545-7464 or 508-898-2800 for information or for our free Guide to Remote Internetworking Solutions.

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Circle Reader Service #1

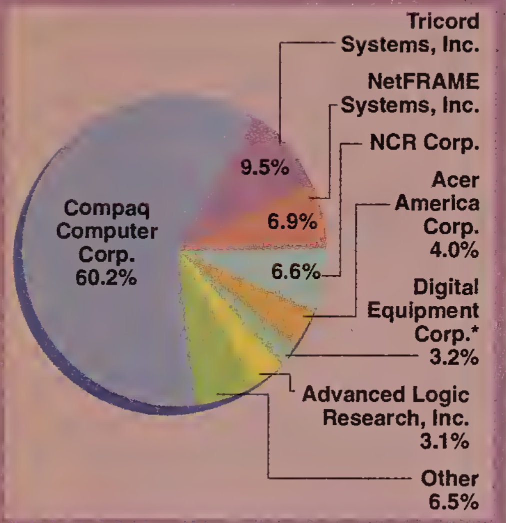
Continued from page 48

asymmetric multiprocessing include: NetFRAME's NF450FT and NF250FT and The Network Connection's Triumph M2 Trac.

Some vendors support both symmetric and asymmetric multiprocessing. For instance, IBM Personal Computer's IBM PS/2 Server 295 can support two application processors working symmetrically and four I/O processors working asymmetrically. This allows users to run a special multiprocessing version of OS/2 on the application processors while getting improved I/O performance no matter what is happening on the application processors.

1992 superserver market shares

Figure 1



*DEC no longer participates in this market.

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

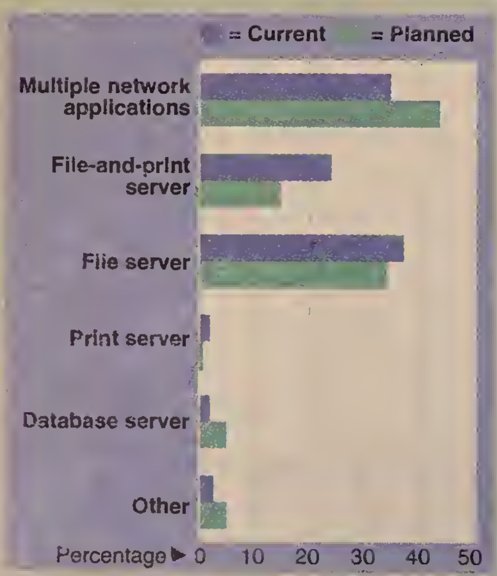
With Tricord's PowerFrame ES5000, a maximum of six application processors work together symmetrically, while as many as six I/O processors work asymmetrically in each of up to six intelligent storage subsystems. Support for SMP does not necessarily rule out a system as a NetWare server, however. It only means that NetWare processing cannot be spread out over more than one processor and that users will not have the option of adding processors to improve NetWare's performance.

A few other factors are relevant when analyzing performance, both on multiprocesssor and single-processor systems, such as the processor type, clock speed and processor cache.

Processor cache is high-speed memory that provides temporary data storage for the processor. Cache size ranges widely (between 8K and 1M byte), both between systems and between processors on the same system. While it is difficult to know the exact effect of processor cache on performance, generally more cache per processor means better performance.

LAN servers by use

Figure 2



SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

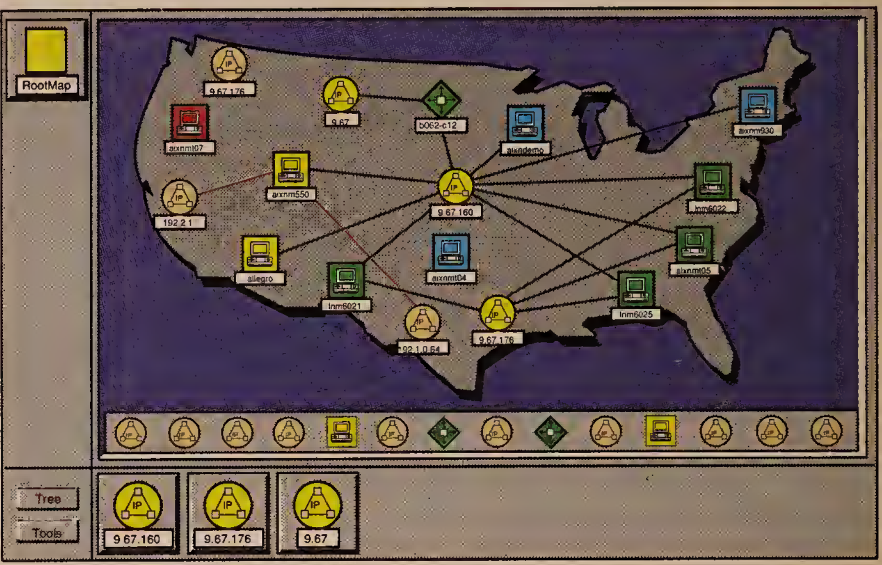
For instance, machines from ALR, NetFRAME and The Network Connection that offer 1M byte of processor cache have a performance edge over machines that offer only 256K or 512K bytes of cache. Systems using the Pentium chip, such as the ALR Evolution VQ, benefit from its built-in 1M byte of writeback cache.

There are two kinds of caching: writeback and write-through. In both cases, the processor deposits information in the cache and the cache controller then writes the data to the disk. With writeback cache, the cache controller waits until the processor is idle before using some of its cycles to write to the disk. With write-through cache, the controller uses processor cycles to complete the disk write immediately, possibly interrupting an ongoing processor job.

ON THE BUS

While processors place an upper limit on system performance, other factors can also limit performance. A common cause of laggardly performance in a system stacked with high-performance CPUs — or even in a typical PC — is a bus design that acts as a bottleneck. Typical LAN server applications, such as NOSes and relational DBMSs, require extensive I/O and relatively little processing. Thus, the server selection process usually involves evaluating how well processing power is matched to the bus and I/O architecture and then determining whether that balance meets a customer's needs.

Standard PC bus designs often cannot supply all of the data needed by even one processor, let alone two. The two standard PC buses used in high-end servers are Micro Channel Architecture (MCA), with a peak throughput of 20M byte/sec, and Extended Industry Standard Architecture (EISA), with a peak throughput of



Control,

Hapless hubs. Rogue routers. Stressed out servers. Nervous nodes. Paralyzed printers. Disappearing data. Power-crazed PC users. Budget slashing bean counters. It's enough to make a network manager's job unmanageable. But now there's a better way to regain control. To master the madness. And your own destiny.

AIX SystemView
NetView/6000 V2

NetView®/6000 Version 2 from IBM Networking Systems offers a greater range of management functionality, has an end user interface that keeps things simple, and incorporates OSF™/DME standards. It's a UNIX®-based management platform that runs on RISC System/6000® workstations with IBM's

33M byte/sec. While many vendors also provide sustained bus throughput figures, these are often dependent on the particular software that is running, while peak rates are absolute.

Most supserservers implement either MCA or EISA buses because they provide standard interfaces that enable users to plug in a wide variety of relatively low-cost LAN adapters as well as other functional add-on boards. However, in addition to these standard PC buses, superservers also implement faster, advanced buses that provide the superhighways to link various system elements. High-end superserver vendors have carried this to its logical extreme, creating bus architectures in which every subsystem can run at full tilt without affecting the performance of any other subsystem.

Both NetFRAME and Tricord, for instance, claim to pull off this balancing act. NetFRAME's systems employ multiple independent buses, which allow more than one simultaneous data stream and eliminates contention on the bus. Tricord's systems use separate buses for disk I/O and network I/O, also eliminating contention. Tricord's superservers use a standard EISA bus with a peak of 33M byte/sec and a fast interprocessor bus, 132M or 267M byte/sec, depending on the model.

Compaq's SystemPro/XL and ProSignia have three buses each: a CPU bus and a bus connecting the CPU to memory, each capable of transferring data at a peak of 267M byte/sec, and a 33M byte/sec EISA bus. Compaq's Dataflow Manager, a standard software feature of both the SystemPro and the ProSignia, juggles data across these three buses and through buffers in such a way that processors and EISA boards can access memory simultaneously more than 70% of the time.

Some NOSes — NetWare, for instance — have a feature called disk caching, which allows information from a disk to be stored temporarily in memory. When used with a NOS feature like disk caching, Compaq's Tri-Flex bus design can improve server performance.

The IBM PS/2 Server 195 and 295 feature

Continued on page 52

RISC may emerge as LAN server

A new option is emerging for local-area net servers: Reduced Instruction Set Computing (RISC) processors.

RISC servers, until recently limited to Unix and proprietary operating systems, will soon run LAN-oriented operating systems, such as Microsoft Corp.'s Windows NT and Novell, Inc.'s NetWare.

However, some observers question whether NetWare and general-purpose RISC boxes are a good match.

"Systems optimized for NetWare typically have lots of CPUs aimed at things like I/O channels," says Lynn Berg, program director for mid-range computing strategies at Gartner Group, Inc. in Stamford, Conn.

"For running NetWare, the RISC chip would offer a negligible advantage over Intel [Corp.] in terms of overall performance because it is not a compute problem," Berg says. Running NetWare on these general-purpose RISC platforms would probably just be a waste of CPU cycles."

At least 10 vendors of RISC workstations and minicomputers have announced Windows NT machines. Digital Equipment Corp. and Ing. C. Olivetti & Co. S.p.A. plan to support NT on DEC's Alpha chip. Acer America Corp., AT&T Federal Systems, NEC Technologies, Inc. and Silicon Graphics, Inc. have said they will implement NT on the MIPS Computer Systems, Inc. RISC processor. And Intergraph Corp. plans to offer NT on the Clipper processor.

DEC, Hewlett-Packard Co. and Sun Microsystems, Inc. have announced Processor Independent NetWare, based on NetWare 4.0, for their RISC-based machines. Two of these companies already sell versions of NetWare that run under Unix: HP under HP-UX and MPEAX, and Sun under Solaris.

Processor Independent NetWare will not run under Unix. There will be no other operating system on the RISC machine, just NetWare running in native mode on a RISC chip.

➨ By Mike Hurwicz

open AIX/6000™ operating system. And it installs with just 6 clicks of a mouse. Now that's control.

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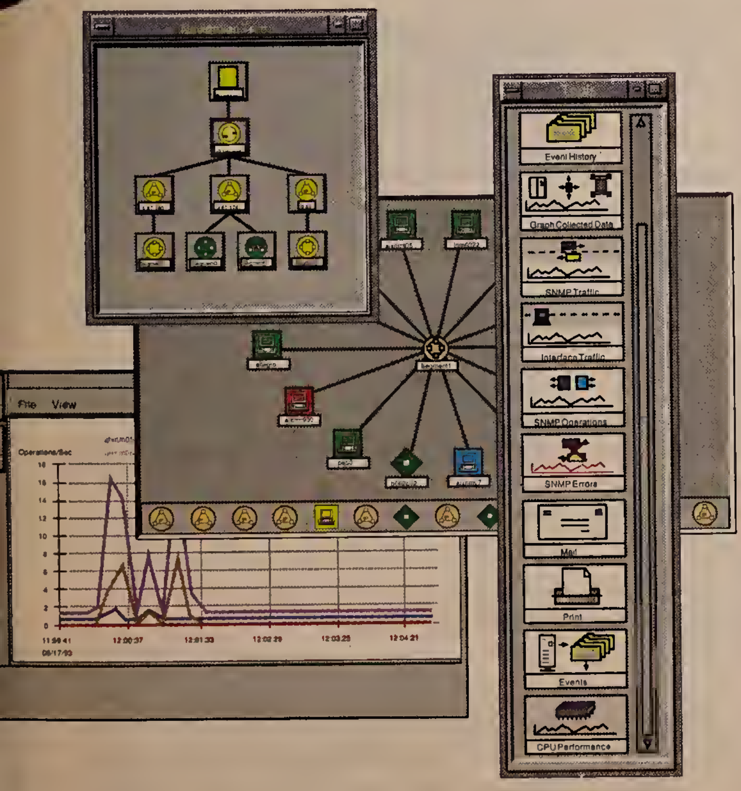

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Continued from page 51

dual independent MCA buses, each transferring data at 20M byte/sec and an interprocessor bus that transfers data at 200M byte/sec. Other machines with special bus architectures include The Network Connection's Triumph M2 SMP/486 and Acer's AcerFrame 3000mp.

RAID definitions and levels

RAID	Redundant Array of Inexpensive Disks
Bit-interleaving	Writes each bit in turn to a different drive.
Byte-interleaving	Writes each byte in turn to a different drive.
Data striping	Spreads each write and read across multiple disks. Simultaneous reads from multiple drives improve performance. Best for large blocks of data, since it processes only one I/O request at a time.
Mirroring	Duplication of each write on a second disk, degrading write performance but providing fault tolerance. Reads may be taken from either disk, improving performance for reads. If the first disk crashes, the second disk takes its place without interruption. Doubles expenditure on disks. Simultaneous reads offer better performance for smaller chunks of data.
Transfer block	The block size of data transferred from disk.
RAID Level 0	Data striping. No fault tolerance. No storage taken up for mirroring or error checking, providing maximum storage for the price.
RAID Level 1	Mirroring. Expensive, but gives immediate access to data on backup disk if primary disk fails.
RAID Level 2	Bit-interleaving. Separate drives for error correcting code or parity information. Designed for host computers.
RAID Level 3	Usually byte-interleaving, but can interleave bits or data stripe. Error checking is efficient for microcomputers. Uses one drive for error checking information. Processes one I/O request at a time, so best suited to large blocks of data.
RAID Level 4	Interleaves transfer blocks. Can process multiple read transactions simultaneously, enhancing performance. Single drive for error checking information must be involved in all writes, so one write is processed at a time.
RAID Level 5	Every drive contains both data and error checking information. Interleaves transfer blocks. Can process both multiple reads and multiple writes simultaneously, for best performance of any level.
RAID Level 6	Not standardized yet. Like RAID 5, but error checking information for each disk is duplicated on two other disks. Better fault tolerance than existing RAID levels.
RAID Level 10	Also called RAID 1/0, RAID Level 10 combines RAID Level 0, for improved performance, and RAID Level 1, for fault tolerance.

SOURCE: MIKE HURWICZ, EASTSOUND, WASH.

Aside from the bus design, customers should be sure to analyze the number of slots that are provided for each bus; this number varies from about four to 15. Slots are used for LAN adapters, disk controllers and communications cards. Net managers should be sure to select a server with enough slots for the given application and also with enough to support future applications.

THE RIGHT SOFTWARE

While analyzing bus designs can be rather complex, customers will have an easier time assessing which operating systems and NOSes they need and which systems offer them. While most LAN servers are still employed to anchor a NOS, users are increasingly utilizing them for a growing range of client/server applications (see Figure 2, page 50).

In fact, certain vendors have targeted specific applications, making their systems obvious candidates for closer scrutiny for customers with that application in mind.

With a few exceptions, every system supports DOS, OS/2 and Unix — usually The Santa Cruz Operation, Inc.'s SCO Unix. Exceptions include the IBM PS/2 Server 195 and 295, both of which support only OS/2; HP's NetServer LM, which does not support Unix; and the Unisys Corp. U 6000/65, which does not support OS/2. NetFRAME's NF450FT and the NT250FT do not support DOS.

Evaluating NOS support is also a straightforward task. One positive development is that until quite recently, some superservers could not run shrink-wrapped NOS versions but could only run a customized implementation of a NOS. Today, all of the systems listed run NOSes out of the box — not custom versions.

Many users will prefer to select a vendor that has made special efforts to optimize their systems for a particular application.

For instance, the IBM PS/2 Server 295 and 195 support three NOSes: LAN Server, LAN Manager and NetWare. However, most users of these systems are running an OS/2-based SQL database server with LAN Manager or LAN Server. If that's the application, these machines are a natural.

NetFRAME servers, in contrast, were developed with NetWare in mind, although their application processors can run a variety of operating systems and NOSes. NetFRAME's servers provide network and disk drivers optimized for a NetWare environment. The modular I/O architecture also provides the high level of I/O often needed by a NetWare server. NetFRAME customers can also purchase a server with NetWare preinstalled.

Tricord, while supporting all of the major NOSes, has so far targeted the market of applications that are commonly associated with host systems. Through its highly configurable architecture and its support for diverse operating systems and NOSes, Tricord superservers are capable of supporting a wide range of applications, both compute-intensive and I/O-intensive applications.

Several vendors say they are planning to support Windows NT Advanced Server, including: ALR, AST, Dell Computer Corp., HP and The Network Connection. NetFRAME and Tricord say they are examining the option.

RELIABILITY

A superserver might offer blazing performance and fit the environment like a glove. But if it does not provide rock-solid reliability, it won't even make the starting lineup.

Error correcting code (ECC) memory is one important fault tolerance feature. Previously a feature of minicomputers, ECC is now implemented in 11 of the 15 multiprocessing systems listed in the Buyer's Guide chart. ECC memory makes it possible for the server to detect and correct memory errors. Without ECC memory, memory errors caused by transient power glitches could cause the entire sytem to crash. A few multiprocessing machines lack ECC memory: ALR's Proveisa, HP's NetServer LM and The Network Connection's Triumph M2 Trac, for instance. None of the single-processor machines listed support ECC memory.

Another key fault tolerance hardware feature is parity checking on the bus, which inspects data to make sure that it hasn't been corrupted. Most superservers support this feature. Every system listed in the chart, both superservers and PCs, also support parity checking on memory.

One common fault tolerance feature supported at some level by all the superserver systems and by most PC systems listed is RAID. As the name implies, RAID subsystems use multiple, inexpensive disks — as opposed to high-quality, single-disk or tape storage devices — to provide highly fault-tolerant storage. Users need to scrutinize the various types of RAID to understand the trade-offs of reliability, price and performance (see graphic, this page).

Most high-end server vendors provide subsystems supporting at least RAID Level 1: disk mirroring. NetFRAME offers only Levels 0 and 1, while IBM and The Network Connection offer only Level 5. The vendors with the widest selection of RAID levels are ALR, HP and Tricord, all of which support four RAID levels. Customers are not limited by the RAID systems offered by the system vendors, however. They can also be acquired from third parties.

However, some users have found that RAID has its disadvantages. "The last time I priced cards for RAID Level 5, they were around $17,000 per card, and you needed two cards," says SatoTravel's Venzke. "That's not counting the extra disk storage. Also, the server can take a 20% to 30% performance hit on writes. Our largest file has 20 million records in it. I'm not sure if, for the extra reliability, I'm willing to take a 20% to 30% hit on a file that size."

Disk controllers can also offer reliability features, such as controller-based disk mirroring, duplexing and hot fix — with the latter enabling disk controllers to immediately correct write errors. For example, The Network

See Servers, page 56

Standards support is No. 1

The No. 1 criterion *Network World* readers use when selecting multiprocessing superservers and high-end PC-based servers is conformance to standards, a recent *Network World*/Focus Data, Inc. survey finds.

Readers sometimes cited conformance to their corporate computing standards; in other cases they cited de facto standards.

"We selected Compaq Computer Corp. because of its compatibility with our existing computing environment," says one reader. "We are very tight with Novell, Inc. NetWare, and we know that it is going to work on Compaq machines. But I would also select Compaq because of its service and its systems' reliability."

LAN server selection criteria

Based on highest possible score of 10

Criteria	Importance rating	Satisfaction rating	
		Higher than importance rating	Lower than importance rating
Conformance to standards	9.07		✔
Service/ support	8.73		✔
Performance	8.69		✔
Expandability	8.31		✔
Server management	7.93		✔
Ease of use	7.62	✔	
Fault tolerance	7.53		✔
Price	7.08	✔	

SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

Another reader thinks much the same.

"AST [Reaseach, Inc.'s] systems are Banyan VINES-certified, and we have to be able to run VINES on whatever we buy," the reader says. "AST also has very good telephone support. We have also selected AST because of its warranties and price."

After standards, readers cited service/support, performance, expandability and server management, in decending order of importance, as factors they consider when purchasing both superservers and high-end personal computer-based servers.

"Internal support is a real issue for us, so I don't want to have to develop expertise for any more vendors than I have to," one reader says.

Readers commenting strictly on factors they deem important in analyzing multiprocessing superservers often cited fault tolerance.

"The biggest advantage of superservers, in general, is their fault tolerance features," one reader says. "I would recommend Tricord Systems, Inc. because of the strong redundancy features. Tricord also has much more disk space available than the other superserver vendors."

The Tricord PowerFrame ES5000 supports up to 506G bytes of storage. NetFRAME Systems, Inc. NF450FT supports the next largest amount of storage, with up to 89.6G bytes.

Another reader cites NetFRAME as the preferred superserver vendor, also pointing to reliability features.

"I would select NetFRAME because of its added reliability. It is the only vendor I know that has the error-checking capabilities that a mainframe has. But I would buy [from] Compaq for low-end 486 single-processor servers," the reader says.

Readers generally agreed that for both superservers and high-end PC-based servers, price is the least important factor.

"I would pay up to $200,000 now for a superserver, but it would have to give me exactly what I need," says one reader. "Regarding the highest price I would pay for a superserver, I don't really look at it that way. Price is no problem."

While 33 of 100 readers interviewed currently own a multiprocessing superserver, 51 said they are going to buy at least one during the next 12 months. Twenty readers said they will purchase one or two, 19 readers said they will purchase from three to six superservers, and one reader intends to purchase 50 superservers.

Superserver uses

Based on 22 responses

Use	Percentage of processing power devoted now	Percentage devoted 1 year from now
Network operating system	33	32
Database	30	37
E-mail	13	6
Storage	12	12
Communications	10	7
Other	2	6

SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

By Kyle Nitzsche

Focus Data, a Framingham, Mass.-based market research firm, gathers data from end users to determine network and information systems usage, trends, needs and user satisfaction levels. For more information, call Mona Dabbon at (508) 626-2556.

New DOS teeters between perils and pragmatism

Although several DOS 6.0 services are ripe for net users, quirky trade-offs may negate user gains.

BY DAVID STANG

When Microsoft ships a major revision of DOS, users sit up and take notice. And with only six major versions over 11 years, a new version is certainly news.

Naturally, net managers may wonder if DOS 6.0 truly is an improvement — if it is worth the trouble and expense of upgrading the entire end-user base.

The answer is two words: It depends.

DOS 6.0 sports some innovative features users will love, but it also contains some dreadful problems that may leave users begging for mercy. Used judiciously, it is a very good deal. Used otherwise, it could be a disaster.

For network users, there's a handy feature that will conserve client workstation memory, freeing precious space for network drivers and applications. There's also a built-in set of antivirus services that fall far short of what companies really need.

Still, until users take a closer look at the features and functions offered by DOS 6.0, they may not be sure if the benefits outweigh the trade-offs.

THANKS FOR THE MEMORY

DOS 6.0 comes with MEMMAKER, a program that automatically reconfigures CONFIG.SYS and AUTOEXEC.BAT files to give users the maximum possible conventional memory. For network managers, this utility will free up workstation memory for network drivers and large applications.

Make no mistake: MEMMAKER is not a memory manager. It is a configuration manager that works in tandem with memory managers to set up CONFIG.SYS and AUTOEXEC.BAT files in the most efficient way. It scans a machine's memory looking for programs that consume memory, such as Windows.

MEMMAKER takes only about a minute to run and produces a better result than if users attempt to modify CONFIG.SYS and AUTOEXEC.BAT files themselves. Users who have never made any changes to these files since installation or have made changes on their own may save as much as 100K bytes with MEMMAKER. To get the most out of MEMMAKER, remove unneeded statements from CONFIG.SYS and AUTOEXEC.BAT files and add lines for all programs that you want loaded in memory. Don't worry about the order of loading or whether certain programs should be loaded into high memory; MEMMAKER will make those decisions.

For many users, MEMMAKER's configuration services are worth the price of DOS 6.0.

AHEAD ON BACKUP

If MEMMAKER isn't worth the price of DOS 6.0, then MSBACKUP and MWBACKUP certainly are. These are a pair of backup utilities for DOS and Windows environments, respectively. MSBACKUP far outpaces the mediocre backup options offered in previous versions of DOS, and MWBACKUP offers Microsoft backup services to Windows users for the first time.

Both programs are fast and, during backup, offer quality assurance and good error recovery. Both DOS and Windows versions enable workstation users to back up local machine data to their personal directories on the server where it can be backed up or archived to tape.

As for reliable data backup, the products' compression options do a nice job of allowing workstation users to smoothly store multiple files to a single server directory and then pick files off one by one and restore them. In the past, users had to download the entire directory just to get to one file.

Net managers can simplify upgrades to DOS 6.0 by creating a logon script that allows the software to be downloaded automatically from a server to personal computers on a local-area network. The script would also run MEMMAKER from the server. Experiment on a single machine with a user-level logon script before trying this feat. If you don't upgrade from the server, you will have to make house calls to each workstation.

Not everything, however, is perfect about DOS 6.0. Users, undoubtedly, will run into the same problems I had regarding the perils of using DBLSPACE and the false sense of security created by DOS 6.0's antivirus programs, MSAV and MWAV.

DBLSPACE is probably the strongest argument for upgrading to DOS 6.0 and will surely account for a high portion of the product's sales. But, ultimately, DBLSPACE may also turn out to be the strongest argument against upgrading to DOS 6.0.

DBLSPACE is a device driver that approximately doubles the storage capacity of DOS 6.0 users' hard disks by using special compression algorithms.

DBLSPACE poses an interesting dilemma for net managers. It offers local users vast amounts of local storage, which underemphasizes the role of LAN servers. DBLSPACE allows users to store more data locally for privacy and convenience, and because local disk access may often be faster than grabbing data over the net. But with that convenience comes a lot of consequences.

In my experience, during the last eight months of beta-testing the product and installing the official version of DBLSPACE, I've lost information on nearly every double-spaced drive I've created — about a dozen. I've gotten repeated read errors on some and lost everything on others.

If those problems aren't enough, boot viruses can be especially dangerous to double-spaced drives. Whereas past DOS versions boot viruses may not have caused any harm, there is a whole new set of interrupts and disk structures for DOS 6.0 that would allow a boot virus to run rampant.

> **DOS 6.0 sports some innovative features users will love, but it also contains some dreadful problems that may leave users begging for mercy.**

Remember, if users aren't backing up files to a server, they aren't likely to back up with DBLSPACE, either. Consequently, they may eventually have twice as much data sitting on their local workstations at risk. Until the world has some proper recovery utilities for DOS 6.0 drives or begins backing up with religious fervor, I strongly advise against using DBLSPACE.

Should users decide to choose DBLSPACE, they should know it requires a total of two drive letters for every logical drive that is double-spaced. Thus, a user who has a hard drive partitioned into C:, D: and E: will find themselves unable to double-space without turning server drive F: into G:, H: or I:.

If you have many batch files, menus and parameter files for users that reference F:, this won't be pleasant. For net users, the most practical remedy is to use XCOPY to back up all files from their local drives to the server, then use FDISK to create a single partition. Then FORMAT the drive, log on, DBLSPACE this empty hard disk, and use XCOPY to get all the files from the server back to the double-spaced drive. Be warned: There is no "undo" command for a double-spaced C: drive. You have to back it up to the server, FDISK, and reformat it.

ANTI-ANTIVIRUS

Many users know that DOS 6.0 comes with an antivirus program (actually two: MSAV for DOS and MWAV for Windows). And most have heard it is "crippleware" — a weakened version of Central Point Software, Inc.'s already weak Central Point Anti-Virus.

These scanners are probably adequate to scan for most common viruses, but they miss hundreds of viruses that other products commonly detect. Scanning is also painfully slow, taking two to three times as long as competitive products.

The product hangs frequently, forcing users to reboot their machines. MSAV also does not always report when it is infected and can, therefore, infect a user's machine.

It is also sloppy in its virus naming, calling 25 or more strains "Friday 13th" and Michelangelo just "M. Angelo." MSAV can remove many viruses, but it will cause some damage to disks or files when removing such viruses as Sylvia, Alabama, Friday COM1, Doteater, Chaos and Dark Avenger.

If users are pretty confident that they don't need workstation-based virus scanners, then they don't need this service of

See New DOS, page 56

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Chris McGoff, VP, GDSS, Inc.

12:00 Lunch Presentation
Global Groupware: A Status Report
Robert Johansen , Leader, Groupware Outlook Project, Institute for the Future

1:00 pm Groupware at American Airlines
Terry Jones, President Sabre Services, American Airlines

2:00 pm Groupware and Collaborative Technologies: the EDS Experience
David Bess, Director, EDS Center for Advanced Research

3:30 pm Groupware Strategy and Customer Service at British Airways
Chris Peckham, General Manager Crew Resources, British Airways

5:00 pm Summary of Key Points and Call to Action for Managers
Dr. Marvin Manheim and Robert Johansen

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8:30 am —12:30 pm	2:00 pm —6:00 pm
Business Process Re-engineering Techniques, Tools and Methodologies	*A Specific Workflow Methodology for Business Process Re-engineering*
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Successful Deployment of Group Decision Support Systems	*The Internet, A Guided Journey*
Business Strategy to Achieve Global Excellence	*Integrating Process Re-engineering and Workflow*
Tutorial on Apple Open Collaborative Environment (AOCE)	*How to Build Groupware Systems on the Macintosh*

Tuesday, August 10

Exhibit hours, 12 - 7 p.m.

8:30-9:00 a.m.	**Welcome to GroupWare '93** *David Coleman, GroupWare '93 Conference Chairman; Editor, GroupTalk Newsletter*			
9:00-10:00 a.m.	**William H. Davidow, Author, *The Virtual Corporation*** *Groupware and the Virtual Corporation*			
	Break			
10:30 a.m. - 12:00 p.m.	**Executive Innovators Roundtable (Q & A from the audience)** *Esther Dyson, Editor and Publisher, Release 1.0 (Moderator)* *John Landry, Chief Technology Officer, Lotus* *Alan Ashton, CEO, WordPerfect* *Steve Jobs, CEO, NeXT* *Mike Maples, Office of the President, Microsoft*			
12:00 - 1:30 p.m.	**Lunch Presentation, sponsored by Fischer International** Addison Fischer, President, Fischer International *Workflow.2000 - The Paperless Office: Workflow, EDI and Electronic Commerce*			
	SOFTWARE ISSUES		HUMAN ISSUES	
2:00 - 3:30 p.m.	***Strategic Approaches to Workgroup Computing Panel*** Krystina Filistowicz, Dataquest (Moderator)	***Integrating Groupware into Your IT Strategy*** Art Beckman, Manager, Information Technology Services, PG & E	***The Cultures of CamelWare*** Michael Schrage, Syndicated Columnist, *L.A. Times*	***GroupWare User Experiences*** A: A SHAREd Collaborative Environment for Mechanical Engineers B: Groupware Implementation at SunMicrosystems
	Break (Exhibit Hall open)			
4:00 - 5:30 p.m.	***The Future of Lotus Notes*** Cliff Conneighton, Notes Product Manager, Lotus	***Groupware for Document and Image Management*** Scott Wallace, Principal, Londahl & Wallace Consulting	***The Human Side of Groupware*** Bob Bostrom, Pres., Bostrom & Assoc. Vikki Clawson, Senior Partner, Bostrom & Assoc.	***Organizational Issues in Groupware Implementation*** Robert Halperin, Executive Director, MIT Ctr. for Coordination Sciences
5:30 - 7:00 p.m.	**Cocktails and hors d' *oevres* In the Exhibit Hall** ***sponsored* by Lotus**			

Wednesday, August 11

Exhibit hours, 12 - 7 p.m.

8:30-9:30 a.m.	**David House, Vice President Strategic Planning, Intel Corporation** *The Technology Trends Building the Foundation for Groupware*			
9:30-10:30 a.m.	**Alan Scherr, IBM Fellow & Vice President Technology, IBM Consulting Group** *Business Process Management and Groupware*			
	Break			
11:00 a.m. - 12:30 p.m.	**Groupware Users Roundtable** *Stewart Alsop, Editor-in-Chief, Infoworld (Moderator)* *Bill Skilton, Chevron Information Systems* *Art Beckman, Manager, Information Technology Services, PG & E* *David Marshak, The Patricia Seybold Group*			
12:30 - 2:00 p.m.	**Lunch Presentation, sponsored by Microsoft** Tom Evslin, General Manager, Connectivity Business Unit, Microsoft *Microsoft's Workgroup Strategy*			
	SOFTWARE ISSUES		HUMAN ISSUES	
2:00 - 3:30 p.m.	***Meeting Environments of the Future*** Jay Nunamaker, CEO, Ventana Corporation	***Group Communications, Management & Groupware Tools*** Clive Holtham, Professor, City University, London	***The Promise of Workflow*** Ronni Marshak, VP The Patricia Seybold Group	***Groupware User Experiences*** A: Groupware and Change at BP B: Groupware For Air Traffic Flow
	Break (Exhibit Hall open)			
4:00 - 5:30 p.m.	***Database Technology and Groupware Panel*** Kevin Strehlo, *Infoworld* (Moderator) Other Panelists TBD	***Groupware in Multivendor Environments*** Jeff Held, Director, Ernst & Young Northeast	***Contrasting Workflow Models Panel*** Jim Bair, Cooperative Systems Consulting (Moderator)	***Lotus Notes Experiences Panel*** John Dwyer, Systems Engineer, Corporate Software (Moderator)
5:30 - 7:00 p.m.	**Cocktails and hors d' *oevres* in the Exhibit Hall** **sponsored by *Network World***			

Thursday, August 12

Exhibit hours, 10 a.m. - 4 p.m.

8:30 - 9:30 a.m.	**Steve Jobs, CEO, NeXT** *Using Object - Oriented Programming to Enhance Workgroups*			
9:30 - 10:30 a.m.	**Gursharan Sidhu, Technical Director Collaborative Systems, Apple Computer** *Apple's OCE and Groupware*			
	Break (Exhibit Hall open)			
	SOFTWARE ISSUES		HUMAN ISSUES	
11:00 - 12:30 p.m.	***Meeting Systems for Distributed Environments*** Gantt and Beise, AIRMICS	***Multimedia on the Internet*** Jay Weber, EIT	***New Behaviors for New Technologies*** Carol Ann Ogdin, Consultant, Deep Woods Technologies	***Groupware User Experiences*** A: Groupware in the Military B: Groupware in a Law Office
12:30 - 2:00 p.m.	**GroupWare '93 Awards Presentation Lunch and Concluding Remarks** Co-sponsored by Intel			
2:00 - 3:00 p.m.	**Paul Saffo, Research Fellow, Institute of the Future** *Groupware and the End of the Corporation*			
	Break (last break during Exhibit Hall hours)			
3:30 - 5:00 p.m.	***Messaging Transport Platforms to Facilitate Groupware & Workflow*** Ron Cully, Senior Marketing Manager, Novell, Inc.	***Groupware on the Macintosh*** Tom Dale,Project Manager, Study into Collaborative Computing, CCTA	***The Bottom Line: Workforce Performance*** Dr. Ghenno Senbetta, Manager, Andersen Consulting	***Groupware User Experiences*** A: Microsoft User Story, TBD B: Digital User Story, TBD

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Servers

Continued from page 52

Connection includes such controllers in its two Triumph superservers. Such disk controllers can also be acquired from third parties.

PC-based servers are generally limited to disk subsystem-based reliability features, such as RAID. None have ECC memory or parity checking on the bus, although parity checking on memory is a standard feature of every system listed in the chart.

Some server vendors also implement Novell's System Fault Tolerance Level III. This provides complete server-level mirroring in which every transaction on one server is duplicated on a backup server. Tricord, for instance, has announced SFT30/33C and SFT30/66C superserver packages, which consist of a pair of single-processor PowerFrame superservers connected by an EISA cable.

SPOTTY MANAGEMENT

Reliability features are a necessity to many users. But capable management features could let the net manager find out if a problem was brewing and possibly forestall it.

Superserver vendors provide a range of management features, from SNMP server agents to special software running on dedicated, battery-operated management processors to environment monitoring and remote configuration tools.

NetFRAME and Tricord — for its PowerFrame ES5000 — offer Windows-based management software that runs on an independent, battery-operated module, offering hardware and software troubleshooting and configuration from any point on the network.

One thing these management systems do not do is track individual processes on the server. Managers who are used to mainframes or minicomputers will be disappointed to discover that they cannot determine which server software module is associated with a slowdown, for instance.

When it comes to making their servers manageable via SNMP, PC-based servers and superservers have a spotty record. Acer, ALR, AST and Cubix Corp. systems lack SNMP agents.

Compaq's Insight Manager — which only runs under NetWare — provides an SNMP agent for the server. HP has an SNMP agent, while NetFRAME does not. Tricord's PowerFrame Model 30 and 40 offer the PowerSentry board, which conducts environmental monitoring of the server, but the vendor depends on the NOS for SNMP support.

Compaq has been a leader in server management. The SystemPro/XL features rapid recovery services that automatically reboot downed systems and restart sessions or prepare for remote diagnostics. The firm also offers the Insight Manager, which consists of Windows-based software and an add-on board. It monitors configuration and status concerning Compaq file servers configured with NetWare and, to a lesser extent, all NetWare file servers.

According to Compaq, future versions of Insight Manager will also perform active server configuration tasks. Insight Manager runs only under Novell's NetWare Management System and can manage only NetWare servers. However, versions are planned for managing Windows NT and Unix boxes.

IBM Personal Computer, for its IBM PS/2 Server 295 and 195, offers both a suite of software tools and a dedicated maintenance processor subsystem. Its Maximum Availability and Support System/2 (MASS/2) software tools offer graphical user interface-based monitoring and control of hardware and software parameters, either locally or from a remote site. This includes gathering and displaying historical data for performance optimization and capacity planning. MASS/2 runs on a dedicated, battery-operated Remote Maintenance Processor from IBM Personal Computer.

NO END IN SIGHT

Superservers bring vast processing power and storage capabilities to the LAN environment today. While they've implemented a suite of fault tolerance and management features, the bottom line is that they still have some ground to cover before they can claim to offer a computing environment that is as secure and as reliable as a mainframe.

Users turning their backs on expensive mainframe platforms and seeking new platforms for important applications will demand continuing advancements in server management and reliability. However, since most superservers are constructed in a highly modular fashion, a superserver purchased today will likely have a healthy life span.

➨ Hurwicz is a free-lance writer and local-area network consultant in the Seattle area. He can be reached at (206) 376-5733 or via MCI Mail at MHurwicz.

New DOS

Continued from page 53

DOS 6.0. If users are vulnerable and need such a service, they should probably get something better than what comes with DOS 6.0.

THERE'S MORE, TOO

Users intent on upgrading to DOS 6.0 are likely to encounter a range of other problems when swapping out an older version of DOS. For instance, users moving from DOS 5.0 to 6.0 may be running network drivers (such as NET5.COM) that expect DOS 5.0. They won't operate with DOS 6.0 unless they are added to SETVER.EXE and call SETVER from CONFIG.SYS. This is a minor nuisance, but one that would become quite bothersome if a shop has hundreds of users.

Additionally, companies that have both DOS 5.0 and 6.0 on different machines may encounter problems if paths point to utilities or COMMAND.COM files that are set to work with a DOS version that is different from the one used to boot the machine. Net managers will need to do some planning before upgrading a server.

Now that the pros and cons of DOS 6.0 are a bit clearer, users may have a better picture of whether they should upgrade to this operating system. The arguments are not compelling. It isn't something to avoid, but it probably isn't something to rush out and buy, either.

If users do decide to upgrade, start small. Install it on a single machine and master it before proceeding. Decide what DOS 6.0 utilities users do and do not need. FDISK, Windows utilities not required by DOS users, and the antivirus product might be good candidates for close inspection.

Try installing DOS 6.0 on a small group of machines, and watch what happens over the course of a week. And experiment with installation from a server.

Be ready for the unexepected. And remember, once you've worked out the kinks and got everything running smoothly, then DOS 7.0 will likely roll along.

➨ Stang coauthored *MS-DOS 6* (Carmel, Ind., New Riders Publishing, 1993). He also is chairman of the International Computer Security Association and president of Norman Data Defense Systems in Falls Church, Va. He may be reached at (703) 573-8802 or via the Internet at icsa@digex.com.

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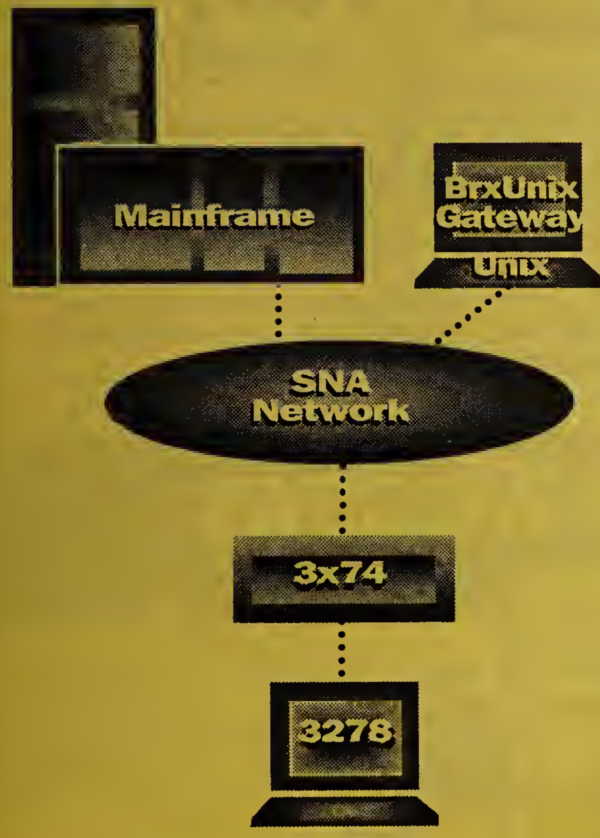

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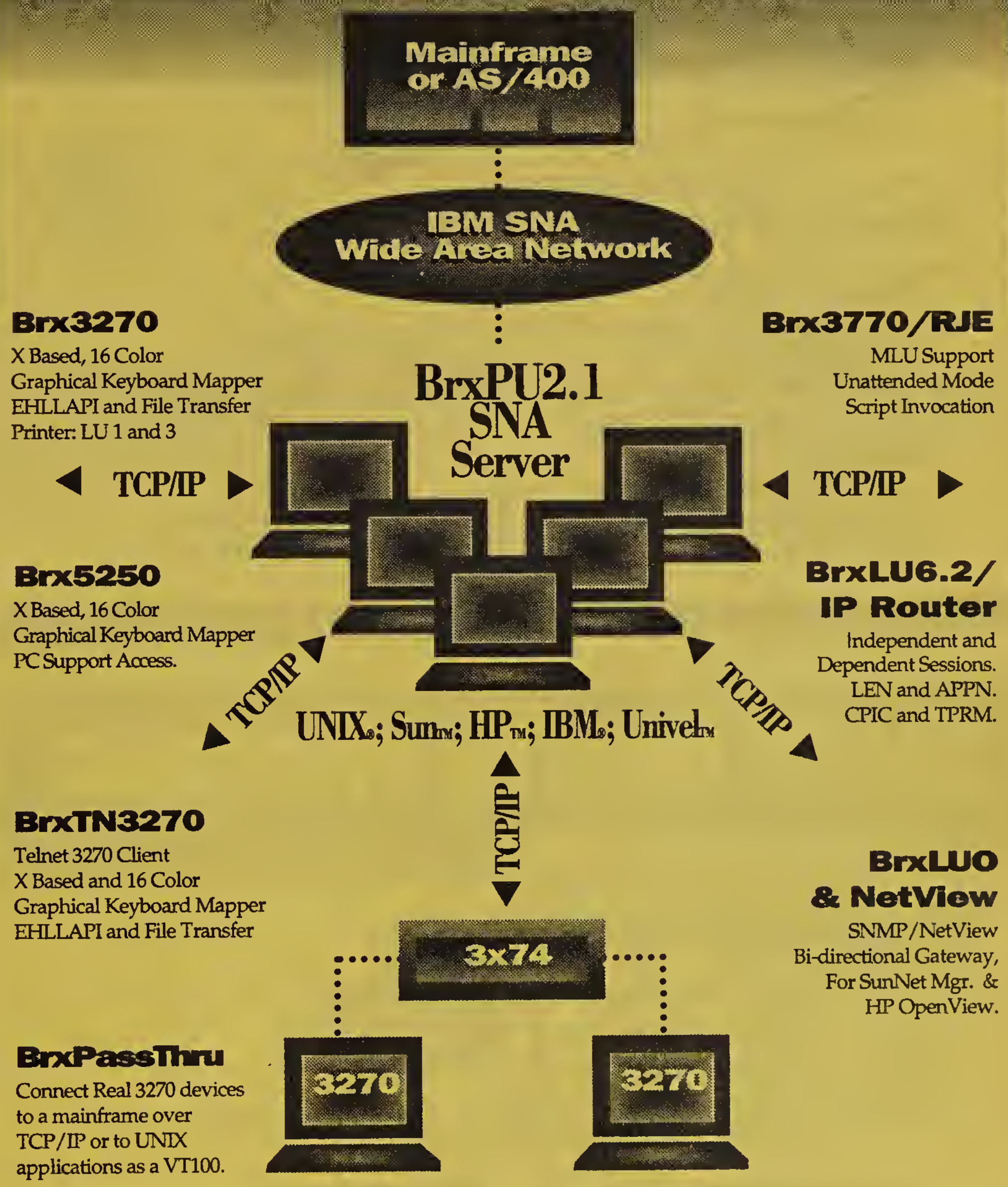

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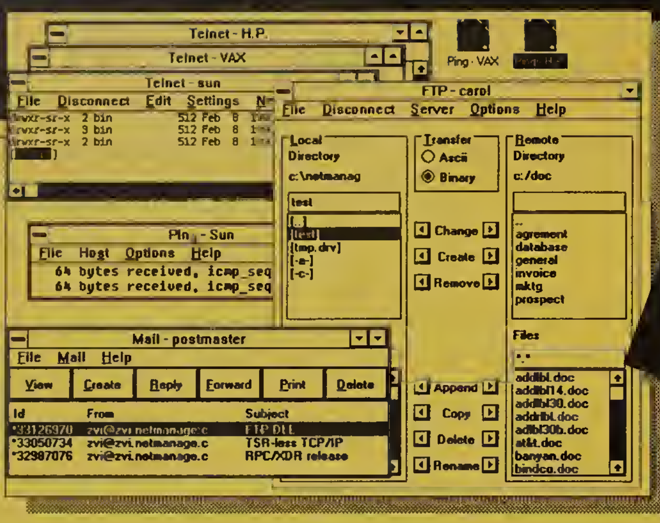

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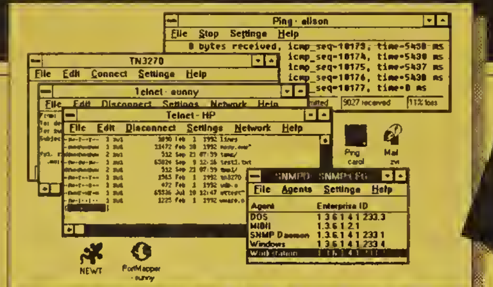

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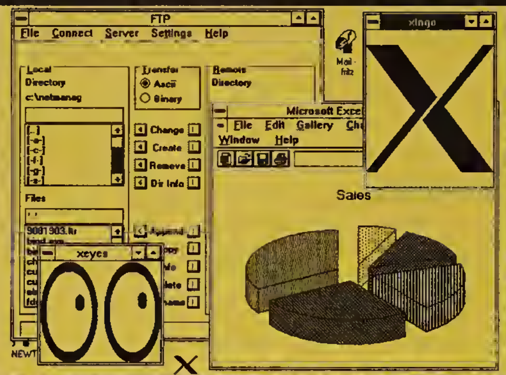

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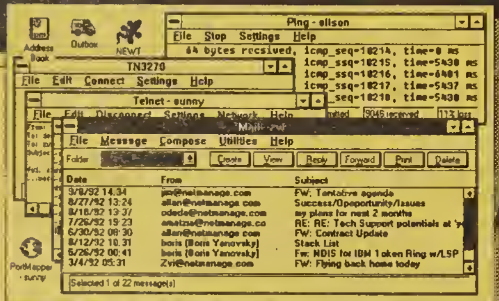

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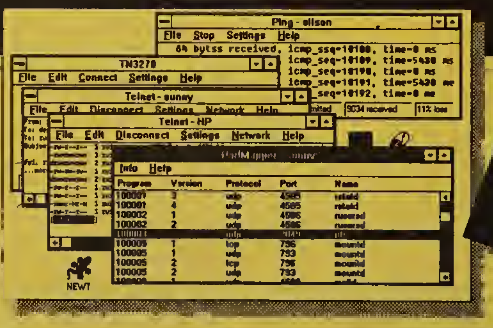

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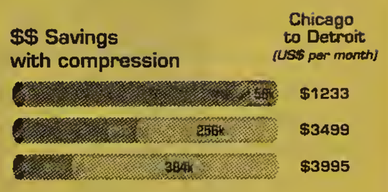

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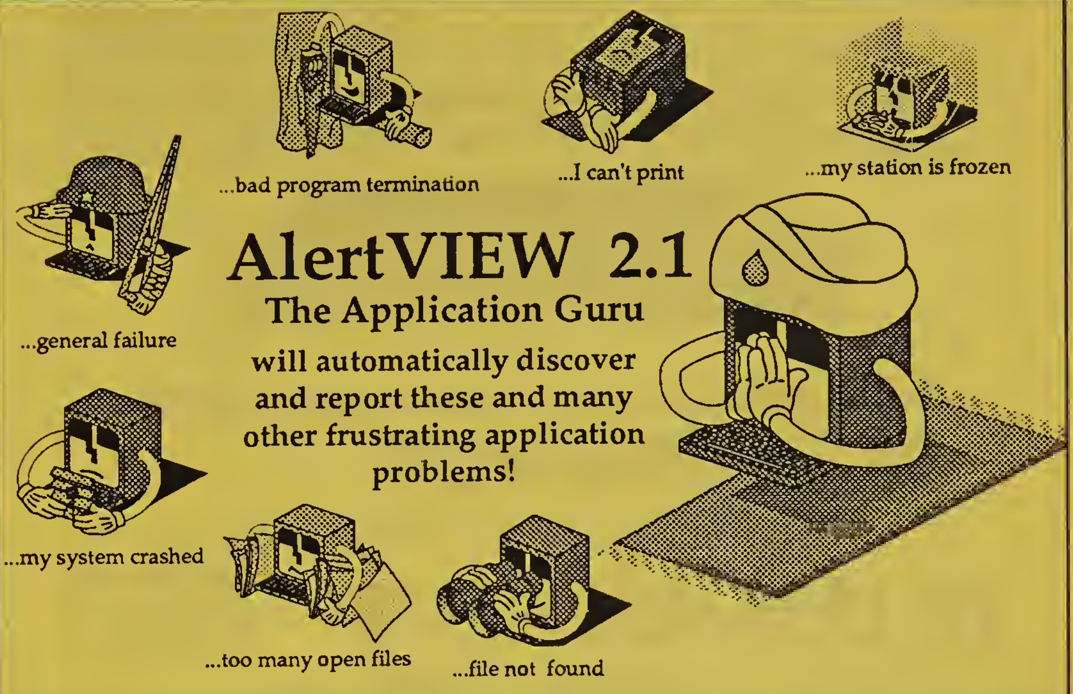

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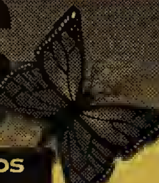

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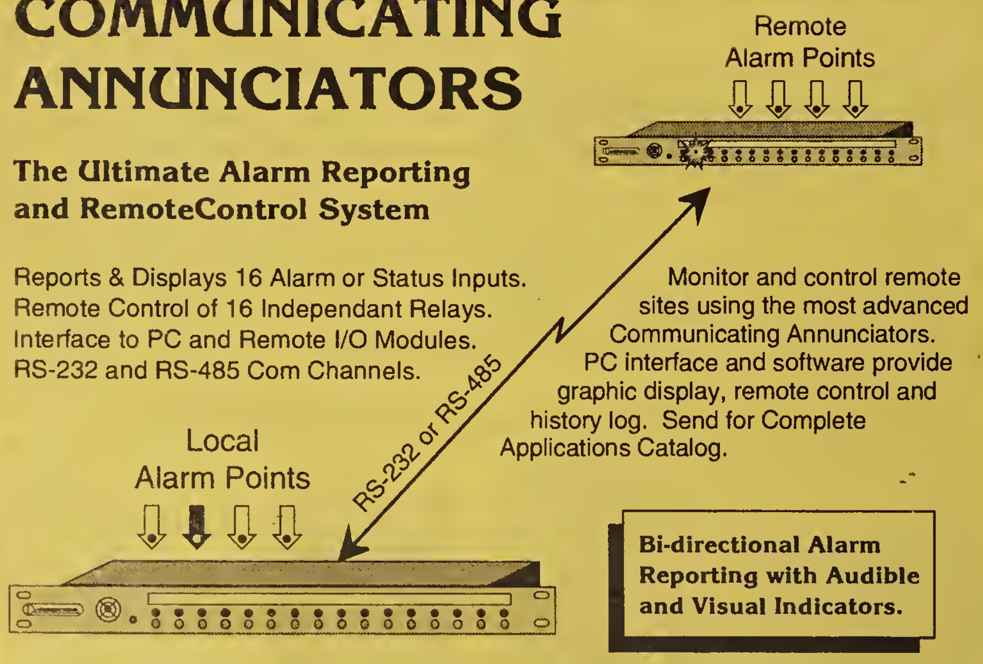

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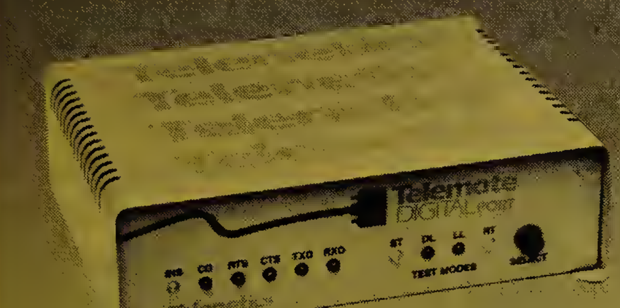

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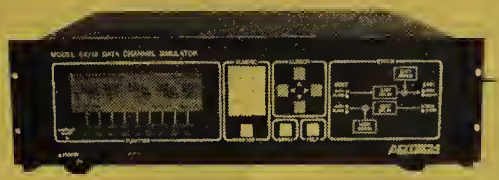

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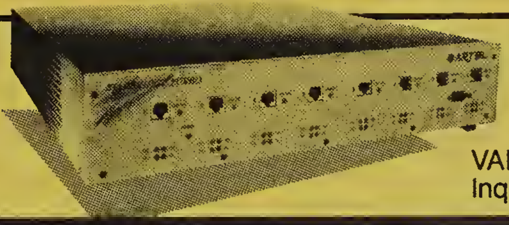

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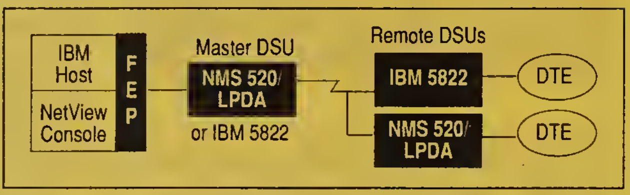

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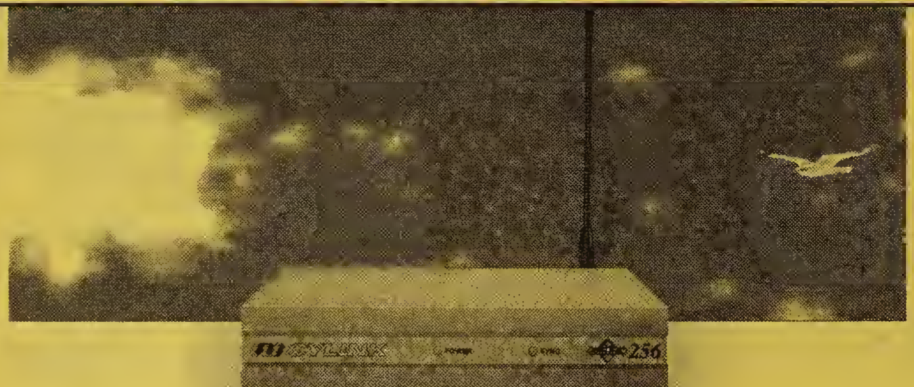

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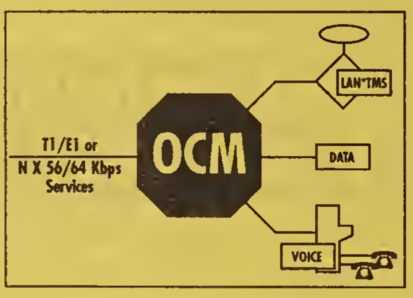

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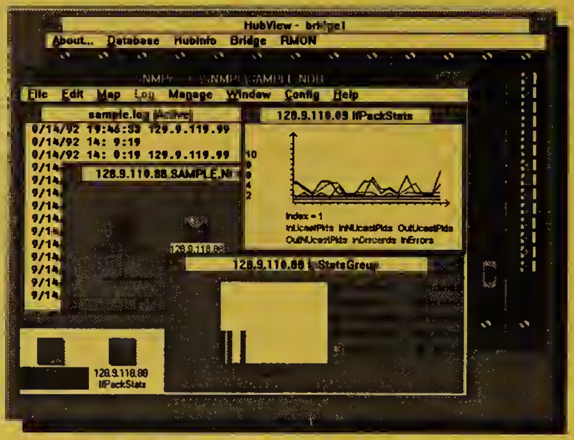

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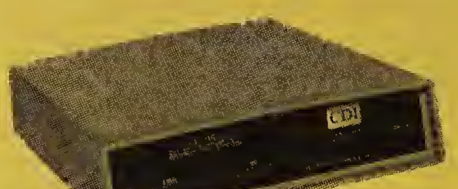

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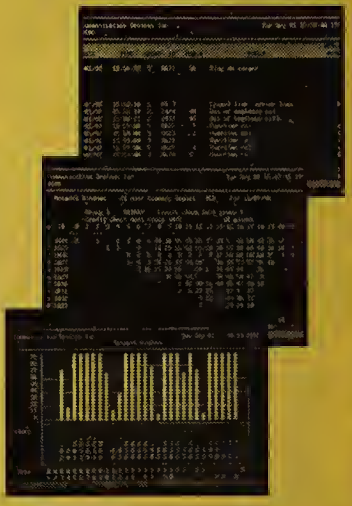

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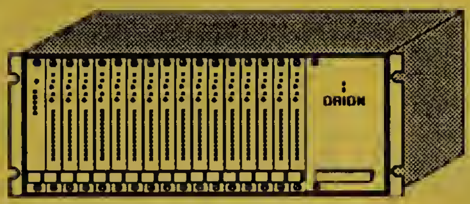

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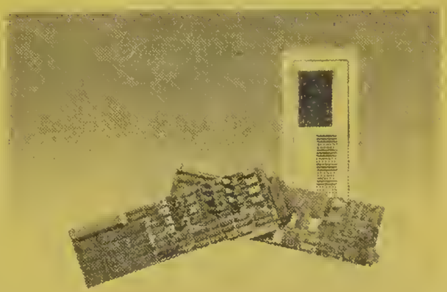

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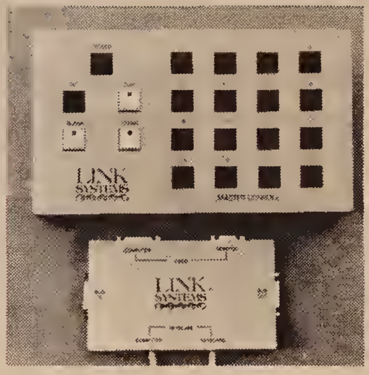

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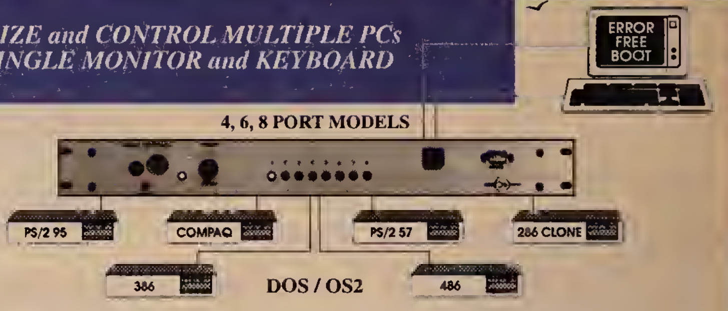

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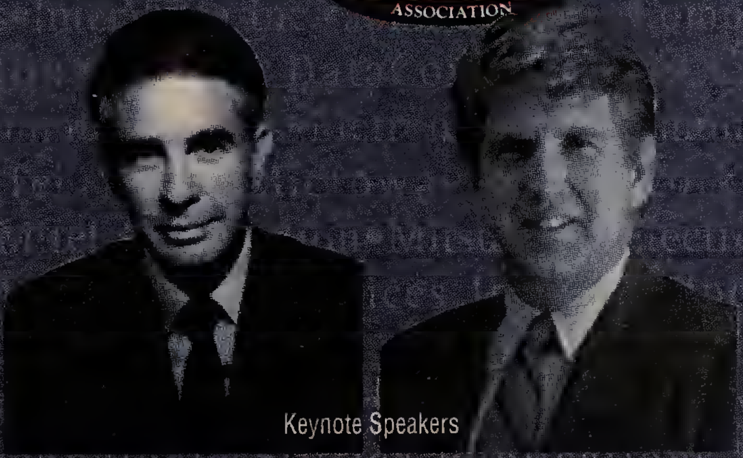

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Continued from page 6

IBM's Common Programming Interface Communications interface for linking systems over Transmission Control Protocol/Internet Protocol networks.

Encina/9000 takes advantage of HP's DCE/9000, which provides communications services required to integrate applications within heterogeneous computing environments.

HP last week enhanced DCE/9000 with support for replicated or mirrored security servers, which eliminate potential performance bottlenecks, and a graphical tool that makes it easy for administrators to modify DCE directories quickly.

In addition, HP has integrated DCE/9000 with its SoftBench computer-aided software engineering tool.

Encina/9000, available now, has a onetime charge of $3,600.

Client software costs $150 per user, and the Encina/9000 Monitors start at $5,500.

The Encina/9000 PPC Executive starts at $800.

DCE/9000 software has a onetime charge of $1,500.

In addition, the prices for DCE client software licenses start at $395, DCE cell directory services start at $3,000, and the prices for DCE security services begin at $3,100.

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SNA

Continued from page 1

6.2 data or a less time-sensitive Lotus Notes application that uses NETBIOS.

"The routers can only give SNA traffic priority if there's no NETBIOS running concurrently on the network," said Kevin Tolly, president of InterLAB. "Considering that (NETBIOS-based) Microsoft LAN Manager, Lotus Notes and IBM LAN Server have high penetration in IBM accounts, that's not likely to be the case."

PRIORITY A HIGH PRIORITY

In an effort to make router-based backbones an attractive platform for wary SNA users, router vendors have developed a number of high-level features that will provide the reliability and data integrity SNA requires.

Key among those features is priority schemes — also known as priority queuing or bandwidth sharing — whose ultimate goal is to maintain session integrity, regardless of the traffic load on the internet or the hodgepodge of protocols vying to get into the fast lane.

According to a study by Infonetics Research, Inc., a consultancy based in San Jose, Calif., more than 80% of the users surveyed said they are interested in consolidating their SNA nets into a multiprotocol backbone. But all of them said they would only do so if they could achieve the response times they have come to expect from SNA.

TOLLY
InterLAB

Mike Morgan, vice president of data networking at American States Insurance Co. in Indianapolis, said high reliability for his SNA traffic is his key networking requirement.

"Our SNA users are our largest group of users, and that's where almost all of our bread-and-butter applications reside," he said, "so naturally that is where I need to provide the best service."

Some router vendors today do have the ability to prioritize among SNA traffic, including Advanced Computer Communications, CrossComm Corp. and Proteon, Inc.

Proteon's Internetworking Traffic Management (ITM) software, which was announced last winter, lets users assign up to 40 priority levels for different types of data and applications.

ITM offers a more detailed level of prioritization than those espoused by Cisco and Wellfleet.

Besides being able to distinguish among bridged protocols, ITM lets users divide wide-area bandwidth into four logical channels, each with a different level of priority. These channels can then be further broken down into 10 subchannels.

Cisco and Wellfleet, however, simply give SRB packets higher priority over routable protocols such as the Transmission Control Protocol/Internet Protocol.

The two vendors' priority queuing schemes work in similiar ways. The packets are simply stored in a priority memory queue and transmitted before other packets.

MAKING DISTINCTIONS

The companies have promised that their respective routers will soon have the ability to further distinguish among protocols. Wellfleet's will be available in Software Release 7.60 in the third quarter, while Cisco's will be available by the end of the year.

Although that's good news, users should have been made aware of this key deficiency when the vendors announced their priority schemes last year, instead of waiting for it to be discovered by a laboratory or, even worse, a live user network, Tolly said.

Routing technology is complicated enough for most users, especially IBM users who have traditionally focused heavily on SNA, and ambiguity and vendor hype will do little to convince them that their SNA data will be secure on multiprotocol nets.

Router vendors must eschew highfalutin claims and tell users in plain English what a product can and, more importantly, cannot do. Otherwise, vendors will face a tougher challenge down the road in persuading SNA shops to make the jump to router-based backbones.

FCC

Continued from page 1

vices by granting it the fist Pioneer's Preference award. Mobile Telecommunications Technologies Corp. (MTEL), which developed a 24K bit/sec wireless paging and messaging system, will be licensed on a pro forma basis once the FCC starts the licensing process.

Without Pioneer's Preference, a company would have to rely on luck in a lottery process.

PCS — the phrase former FCC Chairman Alfred Sikes used when launching the agency's new networking initiative three years ago — encompasses everything from paging to experimental wideband systems for high-speed wireless voice and data communications in the 1800-MHz range. The FCC is likely to proceed with rulings on wideband PCSs in the fall.

"We put [PCS] on a very fast track," said James Quello, acting chairman of the FCC. "This gives the potential for new services and manufacturing jobs."

Added Thomas Stroup, president of Telocator, the Washington, D.C.-based personal communications industry association, "The FCC has opened the way for our industry to bring a new range of services to the American public."

However, uncertainty hangs over the FCC's PCS licensing process because Congress is likely to pass legislation soon to allow spectrum auctioning. FCC sources said competitive bidding might play a role in allocation of the PCS's spectrum.

QUELLO
FCC

The FCC did lay out a plan to allow for the licensing of up to 11 nationwide PCS providers and 13 providers in each of 49 national regions, including Alaska and Puerto Rico, which are dubbed major trading areas. The plan also calls for licensing two local providers in each of 487 smaller geographic regions called basic trading areas.

Although licensing terms are up in the air at the moment, that could not dampen MTEL's joy last week. The Jackson, Miss.-based company is already making plans to roll out a two-way Nationwide Wireless Network (NWN) by 1995. The NWN would support 24K bit/sec messaging — a high speed compared to wireless systems such as those from RAM Mobile Data, Inc. and ARDIS Co., and planned cellular nets based on the Cellular Digital Packet Data standard that will top out at 19.2K bit/sec.

"We have implemented a fully developed demonstration system in the Dallas market [by] working with Motorola [Inc.]," said Jal Bhagat, president of MTEL's subsidiary MTEL Technologies, Inc. With commercial viability of the test system established, he said, MTEL plans a build-out in 300 major markets by July 1995.

MTEL wants to offer two basic wireless services. One would give alphanumeric pagers the ability to acknowledge receipt of the page to the caller. The other would be a two-way wireless messaging service that would be integrated with private and public electronic mail systems.

MTEL, working with Motorola and other suppliers, will introduce a number of hand-held devices to work with the NWN system. In addition, the company will manufacture a Personal Computer Memory Card International Association modem card for use with laptops or PCs, as well as a chipset.

"MTEL lends credence to the fact that wireless services are poised for explosive growth," said Charles Nahabedian, vice president of corporate development at RAM Mobile Data. "I think there will be competition."

But he noted that MTEL is still in the development stage, while in contrast, RAM Mobile Data last week completed the build-out of its network, finishing construction of 840 planned base stations providing coverage to more than 6,000 cities in 210 metropolitan areas.

The dozen or so companies that competed to win the FCC's Pioneer's Preference designation and lost may challenge the FCC's choice of MTEL, which could lead to delays or even an overturning of the decision.

PCN spec on fast track

A Telecommunications Industry Association (TIA) standards committee next month will launch an effort to develop a comprehensive wireless personal communications network (PCN) standard by February.

Once the Mobile and Personal Communications 1800 standards committee, TR 46, releases its PCN network architecture work plan, the race will be on among vendors to get their technology included in a standard that many expect to define the next generation of mobile, high-speed voice and data services.

The TR 46 committee has put PCN on the fast track so the industry can be ready to build standardized equipment and provide interoperable services when the Federal Communications Commission allocates frequency in the 1800-MHz range next year.

By all accounts, the 1800-MHz range appears to be ideal for high-bandwidth data support using experimental low-power PCN cells. Some 1800-MHz microwave users facing displacement under the FCC's spectrum plan are uneasy, but the prospect of ending up with cash compensation for vacating the frequency has assuaged their opposition.

Many in the network industry think there could be 60 million subscribers for personal communications services by the year 2002, with revenues reaching as high as $160 billion annually.

TR 46, formed only a few months ago, includes about 20 representatives from companies such as Bell Communications Research, Ericsson GE, Hughes Network Systems, Motorola, Inc. and Northern Telecom, Inc. The committee is close to completing a long list of service descriptions, security features, PCN air interfaces and intersystem connections with the public network, cellular and Integrated Services Digital Network nets, to name a few.

Anil Kripalani, department head of AT&T wireless systems architecture and chairman of the TR 46 committee, said once the PCN work plan is released in July, anyone interested in contributing to the standard will have the summer to present technology for inclusion.

"We have a [deadline] of October to get the work completed," said Kripalani. "We're looking at the first half of 1994 for standards." The group also intends to conduct field trials before making final decisions on a standard.

ELLEN MESSMER

800 portability

Continued from page 1

have complete details on how all of this is going to work," he said.

Vogt was clear, however, that if users attempt to sell or transfer 800 numbers for profit, they are in violation of the RBHCs' joint 800 tariff. In such a case, regulators, the administrator of the 800 database or a user's Responsible Organization (RespOrg) could deactivate or reclaim the 800 number and reassign it to another user, he explained.

FOR THEIR OWN GOOD

Officials at the RBHCs and Bell Communications Research, the current administrator of the 800 database, said the provision barring users from owning 800 numbers is meant to protect users.Without the provision, users might hoard 800 numbers, particularly vanity numbers that spell out a slogan or name, and sell them for excessive prices.

"The [800] numbers are a national resource that belongs to the American people, and we shouldn't allow one person to control them by selling them back and forth," Vogt said.

But despite these good intentions, the RBHC's tariff rules barring proprietary interest in 800 numbers could cause headaches for users.

For example, it is unclear whether a company can guarantee that it can keep an 800 number during a merger or acquisition.

"Although it is a reasonable expectation, there is nothing in the law that guarantees users that they can transfer an 800 number to another company," said Walter Steimel, a telecommunications attorney with Fish & Richardson, here.

KEEP THE LINE RINGING

In addition, users must be careful not to run afoul of carrier policies on 800 numbers that have lull periods. Currently, voluntary guidelines developed by the local and long-distance carriers state that if a user does not activate an 800 number within 60 days after the number is reserved, the carrier must reclaim and return the number to a national pool.

But what if an 800 number has been turned up but then is inactive for several months? Does the user risk losing the number?

The answer is unclear because there are no formal guidelines. Carriers say there are legitimate reasons for users to have zero usage on an 800 number for several months. Telemarketing companies, for example, are likely to have lull periods.

But the legal battle over disconnection of 800 vanity numbers has already begun. Last year, a customer who claimed that his 800 numbers were disconnected due to inactivity, sued Sprint Corp. Erdman Technologies, Inc., based in New York, ordered two vanity numbers — (800) Panasonic and (800) Redbook — from Spring, ostensibly to start up a telemarketing operation, and, despite Erdman's payment of basic connection charges each month, the numbers were disconnected.

After hearing the case, a federal district court in New York said the court was not the proper forum for the complaint and referred the case to the FCC. Erdman has not yet filed the case at the FCC.

Sprint told the court it believed that Erdman was attempting to hoard and sell the 800 numbers because his usage was extremely low, amounting to only a few cents per month. The FCC has not yet acted.

Vogt confirmed that a carrier has the right to revoke a user's number for a variety of reasons, ranging from suspicion of hoarding or other illegal activity to a restructuring of the area numbering scheme. "If a carrier found that it needed to take the number back, the customer couldn't prevent it," Vogt said.

WHOSE POLICIES?

Although Sprint has taken action in at least this one case, there are questions as to how far carriers must go to enforce the 800 ownership rules. John Shey, director of the North American Service Center, the group at Bellcore that currently administers the 800-number database, said Bellcore has no way to monitor users' activities, so he places the responsibility on long-distance carriers.

Said Rose Ann Haran, a district manager of product marketing for AT&T's 800 service, "I don't see us as the policemen of the industry."

According to the RBHCs, they would move to stop users from trying to sell or hoard 800 numbers, but, often, it would be impossible for the local carrier to learn of such activity.

The FCC is unlikely to step in if it appears that the industry can reach a resolution itself.

Even if users can sort through the questions posed by the 800-database tariff, they could face other legal problems with their 800 numbers, particularly vanity numbers. Portability has heightened many users' awareness of and interest in vanity numbers, but users should proceed carefully.

In at least three federal court cases during the past two years, judges barred companies from using or advertising vanity 800 numbers that were too similar to trademarked words or names of other companies.

✑Taff is a free-lance journalist in Washington, D.C.

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NMS

Continued from page 1

Network Management Protocol features, including support for the Remote Monitoring (RMON) Management Information Base, which will help NMS collect SNMP management data from various networked devices without having to poll each one.

Novell will also repackage and rename the product's components to make the offering easier to understand and more open. In addition, the company will publish NMS application program interfaces to encourage third-party application development, sources said.

NMS 2.0 will consist of three pieces: the NMS Agent, NMS Server and NMS Console.

The NMS Agent will be the terminate-and-stay-resident program within each device to be managed, such as a hub. The Agent will send management information such as port configuration data to the NMS Server, where most of the management data will be processed. The NMS Console application will be able to see and manipulate the network information within the server.

The three components will replace the existing Network Management Map and Network Systems Manager products. Although the new components will support the same functions, they will be able to interact with other net management systems better. For example, the Agent will be able to send alerts to third-party management systems.

The first products from the SunConnect agreement will let SunNet Manager control all NetWare LANs in an enterprise. The offerings are expected to ship in the first quarter of next year.

Included is an application that runs on the SunNet Manager console and collects information such as NetWare server configuration and file system statistics from the NMS Server. It will also let administrators set up and manage NetWare user logon information from SunNet Manager.

A software development kit will contain an interface to which third-party vendors can build SunNet Manager applications to further manipulate data within Novell's NMS Server.

After the intitial rollout, Novell and SunConnect will continue to work on features such as an autodiscovery tool that will let SunNet Manager build a topological map of NetWare LANs throughout the enterprise.

IBM's as yet unnamed application will reside on the NetView/6000 console, which would be tied to IBM's LAN Management Utilities (LMU)/2 program running on the Novell server.

LMU/2 runs on OS/2 or DOS machines and manages NetWare servers. It reports performance and systems management information to LAN Network Manager or, in the future, IBM's LAN NetView platform. LMU/2 also supports the ability to automatically restart machines, and set and monitor Token-Ring and Ethernet utilization thresholds.

"By tying NetView/6000 and LMU together, we will enable users to manage multiple LAN work groups scattered around their enterprise from one central NetView/6000 platform," said Michael Willett, IBM's network management strategist.

Willett did not say when the new application would be available, but analysts said it will likely appear by the end of the year.

NMS 2.0 will consist of three pieces: the NMS Agent, the NMS Server and the NMS Console.

NetWare mgmt.

Continued from page 1

constraints and time required to set up and retrieve messages, said Nina Burns, manager at Creative Networks, a Menlo Park, Calif., consulting firm.

INTEGRATION

Although resident within a laptop, Remote MHS will provide the user with the same message service integration as NetWare Global MHS provides (see story, page 1). For example, Remote MHS will be able to take advantage of the directory services provided through NetWare 4.0 and will likely be able to take advantage of NetWare's security features, sources said.

But because the software will not be a set of NetWare Loadable Modules, users will probably not be afforded the luxury of optional protocol modules, as are Global MHS users, according to sources.

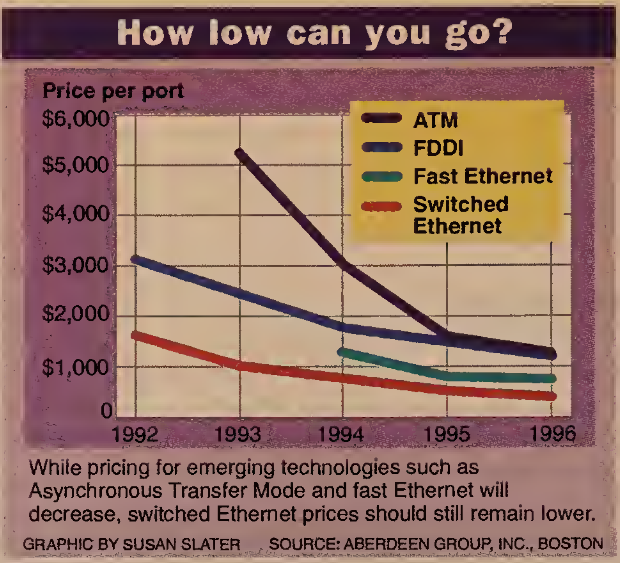
"This will be just like Global MHS but for laptop users," said a source inside Novell. "Remote users don't need all the services Global MHS users need — why buy more than you need?"

Although many analysts and users were not yet familiar with the product, most seemed excited about the prospect of easing remote mail connectivity to NetWare LANs.

"There's an awful lot of laptop users out there, and there's an awful lot of NetWare out there," said Wayne Kernochan, director of commercial systems research at Aberdeen Group, Inc., a research and consulting firm in Boston. "But today, there's no mail solution out there that integrates the two. If you're going to set up some remote service or sales capability and want to tie it into the NetWare LAN, you'd definitely look real hard at this."

Others agreed: "There's no question that this is very important," said Judy Rosall, an analyst at International Data Corp. in Framingham, Mass.

According to one user expecting to be a beta site for the product, the beta version is expected to arrive "any day now," with targeted availability this fall.



How low can you go?

While pricing for emerging technologies such as Asynchronous Transfer Mode and fast Ethernet will decrease, switched Ethernet prices should still remain lower.

GRAPHIC BY SUSAN SLATER SOURCE: ABERDEEN GROUP, INC., BOSTON

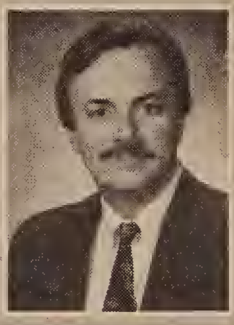
Chipcom, Artel

Continued from page 1

unit interface connections. There is also an RS-232 port for local and out-of-band management.

When configured as an Ethernet switch, the Interconnect can support three dedicated 10M bit/sec links between any six of the five external and three internal Ethernet segments.

The Interconnect forwards 64-byte packets at the rate of 42,000 packet/sec and filters at 90,000 packet/sec, with an aggregate throughput of 45,000 packet/sec.



CONKLIN
Artel

Functioning as a bridge, the module offers similar performance and supports the Spanning Tree Protocol.

The module's routing features include support for the Transmission Control Protocol/Internet Protocol, Novell, Inc.'s Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) and Digital Equipment Corp.'s DECnet Phase IV.

FUTURE SUPPORT

Future support will include Apple Computer, Inc.'s AppleTalk, Open Systems Interconnection and Banyan Systems, Inc.'s VINES protocols. Configured as a router, the module supports the Routing Information Protocol and Open Shortest Path First.

Performance figures were not available, but Dan Poranski, product-line manager at Chipcom, said aggregate routing throughput should be in the 28,000 to 30,000 packet/sec range.

The Interconnect can also provide the three functions simultaneously to different ports.

For example, it can set up a switched Ethernet link between Ports A and B while routing traffic between Port C and a local-area network segment supported by one of the hub's Ethernet backplanes.

"It's not the Cadillac [of Ethernet switches], but that's one of the trade-offs of combining the three capabilities on one platform," said Charlie Robbins, director of communications research for Aberdeen Group, Inc., a consultancy in Boston. "Chipcom's approach is similar to the integrated strategy of Alantec's PowerHub, which has caught on in certain niches."

The module, which supports the Simple Network Management Protocol, takes up two slots in the 17- or six-slot ONline hubs.

The Interconnect with bridging functionality will be available in the third quarter and cost $8,495. Switch and routing features, which cost $5,995 and $10,495, respectively, will follow in the next quarter. Software upgrade kits will range in price from $4,000 to $7,000, depending on the upgrade.

Artel last week rolled out new FDDI capabilities for its Galactica switching hub, as well as logical work group and user-defined filtering features. Artel has been in the limelight of late, having won deals with hub makers such as Cabletron Systems, Inc. and Xyplex, Inc. to resell Galactica.

"Galactica has always been one of the top performing boxes as proved by independent testing at Harvard University, where it achieved rates of 169,000 packet/sec," said Kevin Conklin, Artel's director of marketing.

"By adding support for FDDI, users can attach multiple Ethernets to their high-speed backbone for increased performance," Conklin added.

AVAILABILITY

Available in either single- or dual-attached versions, Galactica's FDDI module allows the user to bridge as many as 24 Ethernet segments to an FDDI backbone.

"The FDDI capabilities are important because users are demanding them. All Ethernet switching vendors will have to provide FDDI as part of their solution," Aberdeen's Robbins said.

Shipping now, the FDDI module costs $12,000.

Artel also rolled out Release 2.0 of the Galactica software that includes Closed Port Group functionality, which allows traffic to be isolated to logical work groups established by the net manager via software, and User-Defined Filtering, which is security software that allows the net manager to apply eight different filters to each port supported by the switching hub.

Available now, the upgrade is free for Artel users with software maintenance contracts. It costs $750 for all others.

☎ Artel: (800) 525-2599; Chipcom: (508) 460-8900.

Comments

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